



**U.S. ARMY
CORPS OF ENGINEERS**

TARGETED BROWNFIELD ASSESSMENT REPORT

**Former Duluth Drycleaner Site
Duluth, Georgia**

Revision 00

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U.S. Army Corps of Engineers
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1 INTRODUCTION

1.1 Background

The United States Environmental Protection Agency (EPA), Region 4 selected the former Duluth Drycleaner Site (Site) for a Targeted Brownfield Site Assessment. A brownfield is a site or portion thereof that has actual or perceived contamination and an active potential for redevelopment or reuse. EPA's Brownfield Economic Redevelopment Initiative is designed to empower states, communities, and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and sustainably reuse brownfields.

EPA Region 4 tasked the Savannah District of the U.S. Army Corps of Engineers with accomplishing the project objectives for the Site. The Former Duluth Drycleaner Site Brownfield Site Investigation Quality Assurance Project Plan (QAPP) was prepared by Savannah District. Savannah District field crews mobilized to the Site and began field investigation activities on 25 March 2010. A survey of the sampling locations, the final field activity, was completed 30 March 2010.

ETJ Downtown, LLC has shown interest in redeveloping the Site. They have already made a significant investment in the area by developing their office space on the adjoining parcel.

The objective of this investigation includes further delineating (vertically and horizontally) the impacts in soil and groundwater and providing a determination of whether contamination is moving onto or off of the subject Site. The objective also includes determining if contamination is present that could pose a threat to human health either through direct exposure to soil and groundwater or via the vapor intrusion pathway. Data Quality Objectives (DQOs) were developed in the QAPP in order to meet these objectives. The DQOs and the project specific action are presented in Table 1.

1.2 Site Location

The Site is located on the corner of Maplewood Drive (aka Knott Street) and South Peachtree Street (aka Main Street). The Site is approximately 9,900 square feet and historically contained a drycleaner facility.

The Site is currently a parking lot. The topography of the Site is flat and the elevation is approximately 1,090 feet above mean sea level (ft msl). The location of the project is shown on Figure 1. The surrounding properties are all commercial. To the south of the Site are various commercial properties. The northern portion is bordered by Knott Street with commercial properties further to the north. The eastern portion is bordered by a right-of-way for Norfolk Southern Railroad with commercial properties further to the east. The western portion of the Site is bordered by Main Street with commercial properties further to the West.

1.3 Site History

From 1975 to 1993 the Site operated as a dry cleaner. The dry cleaners closed in 1993 and the existing building was used to operate a woodworking shop from 1993 to 1998. In 1998 the woodworking operation ceased to operate and the building was demolished and converted into a parking lot. In 2000 the City of Duluth purchased the property.

The City of Duluth found one above ground storage tank (AST) and one underground storage tank (UST) on the Site. A lab analysis of the contents classified the residual liquids as a mineral spirits based compound. The City of Duluth hired AES Environmental to dispose of the liquids. QORE Physical Sciences performed an assessment of the adjacent parcels in 2001. In 2007 the property was to be sold to ETJ Downtown, LLC. Matrix Engineering performed a Phase I Environmental Site Assessment on the property and reported the findings in a May 2007 report. After purchasing the property the developer discovered that the 9,900 square foot (ft^2) parcel that housed the dry cleaning operation was not included in the assessment.

After the discovery, Matrix Engineering Group performed an updated assessment. The assessment concluded that possible contamination existed on the parcel that had formerly housed the dry-cleaning operation. The developer then hired Ahlberg Engineering Group to perform a Limited Phase II assessment of the parcel that housed the former drycleaner. The assessment was completed and the results were presented in an April 2008 report. The results indicated that both soil and groundwater volatile organic compound (VOC) contamination existed at the Site. The assessment was limited in scope (soil screening in four borings using a photoionization detector [PID], two shallow soil samples, and one shallow groundwater sample) so no conclusion was drawn as to the nature and extent of the contamination.

2 PHYSICAL SETTING

2.1 Regional Geology

The Site is located within the Piedmont Physiographic province (Piedmont). The Piedmont runs in a northeast-to-southwest direction and is bordered by the Valley and Ridge and Blue Ridge provinces to the northwest and by the Atlantic Coastal Plain Province to the southeast. The Piedmont is comprised of low hills and narrow valleys. The bedrock is composed of variably metamorphosed sedimentary rocks from the late Precambrian to early Paleozoic Periods that have been intruded by magma during several periods of volcanism. The intrusions formed dikes and plutons of granitic rocks. The bedrock is typically overlain by a layer of residuum that is called saprolite. The saprolite was formed by the weathering of the rocks in place and is typified by soils that become coarser with depth. A layer of partially weathered rock that ranges from a few inches to a few feet usually found just above the bedrock.

2.2 Local Hydrogeology

The uppermost hydrologic unit is the unconfined surficial aquifer, which is comprised of a saprolite-bedrock aquifer. The saprolite-bedrock aquifer is recharged by rainfall and discharges into streams in valley bottoms. The saprolite stores and transmits water in the pore spaces between the soils (clays, silts, and sands) that comprise the saprolite. The saprolite has a much higher storage capacity but lower transmissivity than the underlying bedrock. The bedrock stores and transmits water through secondary porosity features (fractures, joints, and faults). The bedrock can be capable of transmitting very large volumes of water, the transmissivity depends on the density and orientation of the secondary porosity features. Based on the local topography in the area of the Site (Figure 2) groundwater is expected to flow in a northwest direction.

3 SITE INVESTIGATION METHODS

3.1 Sampling Design

The sample designs, soil and groundwater, were selected based on information obtained during document reviews of previous investigations at the Site. Other factors that were considered include limiting the time frame for the assessment and the project budget. A limited vapor intrusion screening was also conducted to determine the potential for vapor intrusion to affect future construction. The sampling design was developed in the QAPP.

3.1.1 Subsurface Soil

Eight subsurface soil samples (and associated Quality Assurance/Quality Control [QA/QC] samples) were obtained from the Site. The selected sample design is a non-probability-based sampling method. This was done in an effort to produce the most resource-effective design to develop data representative of the Site. Previous soil and groundwater sampling has been performed at the Site. The locations and depths of the proposed sample locations were chosen to help fill in the data gaps from previous soil and groundwater sampling.

Non-probability-based design is a design in which the probability of selecting any particular population is not the same as for selecting any other population. Collecting a soil sample from the interval exhibiting the highest photoionization detector (PID) reading is a judgment sampling method. These sampling locations were selected based on engineering judgment as being places where contamination is most likely to exist.

3.1.2 Groundwater

Five grab samples were collected across the Site. The groundwater sampling design is an authoritative sample design. One deep groundwater sample was collected from the area adjacent to the previously collected shallow groundwater sample. The remaining four samples were collected on opposite sides of the property. This layout was chosen to intercept any possible contaminant plumes migrating off of the Site in the surficial aquifer or moving onto the Site from other sources.

3.2 Sample Collection

The procedures for sampling, preservation, handling, custody, and decontamination were performed using guidance from the *USEPA Region IV SESD Field Branches Quality System and Technical Procedures*, November 2007, and any subsequent revisions and the site specific QAPP.

3.2.1 Soil Sampling

A Geoprobe® direct push rig was used to advance a Macro-Core® assembly to the water table. The soils were screened using a PID during the advancement of each boring. A sample was collected from the 0.5-ft interval that exhibits the highest PID reading and another was collected from the 0.5-ft interval just above the water table (i.e., the interval just above where the soil cuttings retrieved from the boring were wet). The soil cuttings

from SB-3 did not exhibit PID readings above zero, so the interval from 9.5-10 feet below ground surface (ft bgs) was chosen as the sampling interval. Soil samples were collected by using a clear polyvinyl chloride (PVC) Macro-Core® liner and PVC syringes to collect a properly sized aliquot of soil. Collected aliquots of the soil were placed in the appropriate precleaned and presoaked sample containers, properly labeled, and packed in coolers for transfer to TestAmerica in Savannah, Georgia (a DoD ELAP certified laboratory). The soil samples were sent to the laboratory within 48 hours of sample collection. Soil sampling data was recorded in the field logbook in indelible ink and transferred to the field data sheet on a daily basis. A sampling summary is presented in Table 2. Copies of the Field Logbook and Sample Data Sheets are included in Appendix A. The soil sampling locations are shown on Figure 3.

3.2.2 Temporary Monitoring Well Sampling

A Geoprobe® direct push rig was used to advance a hydropunch® assembly to the installation depth for the temporary monitoring wells. The rods were then backed out to expose a stainless steel screened section. The water was allowed to equilibrate within the borehole and then the water level was gauged prior to sampling. A mini-bailer was used to collect the samples and the associated QA/QC samples (when necessary) due to the depth to water at the Site. The temperature, pH, conductivity, and turbidity of the water were not recorded prior to sampling because enough water could not be purged from the screen-points.

Care was taken to minimize agitation and aeration of the groundwater samples during collection. Samples were properly preserved, labeled, logged onto a chain-of-custody form, placed into an iced cooler for shipment, and sent to the TestAmerica for analysis. The groundwater samples were sent to the laboratory within 48 hours of sample collection. All of the pertinent groundwater sampling information was recorded on a Groundwater Sample Data Collection Form. These Forms are included in Appendix A.

The shallow temporary wells DP-1, DP-2, and DP-4 were installed to an approximate depth of 45 bgs, shallow temporary well DP-3 was installed to an approximate depth of 40 ft bgs, and the deep temporary well (DP-5) was installed to a depth of 66 ft bgs. The target depth for DP-5 was 70 ft bgs, but bedrock was encountered before the target depth could be reached. The borings were backfilled with 3/8-inch bentonite pellets after the groundwater samples have been collected. The coordinates of each temporary monitoring well were determined using a kinematic GPS. The elevations of the wells relative to each other were determined using a measuring point obtained from Duluth City Planning GIS and standard surveying techniques. The sampling summary is presented in Table 2. The survey information for each temporary monitoring well location is included in Table 3. The locations of the temporary monitoring wells are presented on Figure 3.

3.3 Quality Control

In addition to the primary soil and groundwater samples collected in the field, QA/QC samples (including trip blanks, blind field duplicates, matrix spikes, matrix spike

duplicates, and equipment blanks) were collected during the sampling event at the rate indicated in the QAPP. These QA/QC samples were used to monitor for any changes that occurred to the samples during and after sample collection. The matrix spikes, equipment blanks, and trip blanks enabled evaluation of bias (systematic errors) that could have occurred due to decontamination, handling, storage, preparation, and transport of the samples. Blind field duplicates were used to evaluate the precision of the laboratory. Table 4 details the QA/QC samples collected as a part of the investigation. Table 2, the sampling summary, identifies the associated parent sample.

3.4 Field Measurements

All field equipment needed for sampling as well as safety concerns was properly maintained and calibrated prior to and during continued use to assure that all measurements were as accurate as possible. Each device was calibrated according to the manufacturer's operating instructions to ensure the instruments functioned within their established operation ranges. The calibration data was recorded in the field logbook.

3.5 Equipment Decontamination

Equipment decontamination procedures were implemented to avoid cross contamination of subsurface strata and samples. A decontamination (decon) station was set up at the Site. The decon station was used to decontaminate the personnel, drill rig, and small sampling equipment.

The larger equipment, including drill rig rods and the rig itself, was cleaned with a high-pressure, hot water steam cleaner. The equipment was rinsed once with the steam cleaner then scrubbed to remove any remaining loose debris, followed by another wash with the steam cleaner, and then air-dried.

Prior to use and after each sampling event, all small sampling equipment was properly decontaminated and cleaned to prevent cross-contamination. The equipment decontamination procedure consisted of a potable water rinse to remove visible dirt and debris followed by an alconox wash, another potable water rinse, a deionized water rinse, an isopropyl alcohol wash, and final deionized water rinse followed by air drying of the equipment. Decon buckets containing the various rinses of decon water and decon soaps were laid out on a 10-mil thick plastic sheeting. Phthalate-free, nitrile gloves were worn by sampling personnel during all equipment handling activities. After decontamination, all of the soil sampling equipment were wrapped and stored in aluminum foil (shiny side out) until the next use.

4 ANALYTICAL RESULTS

4.1 Data Validation

Several of the target analytes were detected in several of the wells at tentatively identified levels that were above the method detection limit (MDL) but below the reporting limit (RL). These results were flagged as estimated (J) by TestAmerica and these flags were carried through in the data validation process.

Acetone and chloroform were detected at estimated levels in a rinsate blank and n-butylbenzene and 1,2,4-trichlorobenzene were detected at estimated levels in a method blank. These analytes were also detected at estimated levels in one or more associated samples. Since the reported estimated concentrations were not five times greater than that observed in the blank and since the reported estimated values were less than the RL, the analytes were flagged as non-detect (U) at the RL.

Duplicate samples were collected for both soil and groundwater analyses. The parent and replicate samples are DP-5/DUP1 and SB-4-43/DUP2. The relative percent recoveries for the analytes detected in these sample pairs were within the guidelines established in the QAPP.

The data flags resulting from the data validation are included in the analytical summary tables (Tables 5 and 6). A more detailed summary of the data validation is included in Appendix B.

4.2 Soil Analytical Summary

Eight surface soil samples were collected from four borings areas across the Site. The eight soil samples were analyzed for VOCs (8260B). A summary of the detected constituents is presented in Table 5 and on Figure 4, the data validation report is included as Appendix B, and the complete laboratory analytical reports are included as Appendix C.

4.2.1 Analytical Results

VOCs were detected in all of the soil samples. The VOCs detected were acetone, cis-1,2-dichloroethene (DCE), 2-butanone (methyl ethyl ketone [MEK]), and tetrachloroethene (PCE). Acetone was detected in all of the samples at estimated levels except for SB-4-43, this sample was diluted by a factor of 40 for analysis due to the concentration of PCE in the sample. MEK was detected in three samples at estimated levels. Acetone and MEK are accepted laboratory artifacts and it is possible that the presence of these analytes at estimated levels in the soil samples is the result of vial contamination. DCE was detected in one sample, SB-2-15 (4.5 J micrograms per kilogram [ug/kg]). PCE was detected in six of the eight samples at values ranging from 3.3 ug/kg to 3,500 ug/kg.

4.2.2 Extent of Soil Contamination

Based on the results of the soil investigation conducted at the Site, it is apparent that PCE contamination is present across the Site. Only the samples from boring SB-3 did not

contain PCE. This boring is located on the southeast boundary of the Site and is upgradient with respect to the assumed direction of groundwater flow based on the topography of the Site. The highest concentration of PCE was detected in the deep sample collected from boring SB-4. The boring is located on the southwest boundary of the Site and is cross-gradient from the suspected source area based on the assumed direction of groundwater flow.

The average concentration for each detected analyte was calculated using the reported concentrations for each boring or $\frac{1}{2}$ the method detection limit for borings that were non-detect. The average concentration of each detected analyte was compared to USEPA Regional Screening Levels (RSLs) for industrial soil (as stated in the decision rule in the DQOs) to determine if the Site should be considered contaminated. None of the average concentrations exceed the respective RSL. Therefore, the levels of contamination detected in the soils during this assessment are not considered to present a threat to human health if the Site is developed for industrial use.

The contaminant concentrations presented in this assessment are representative of the concentrations present on the Site. It is possible that isolated locations may contain lower or higher concentrations than those detected in this study. Health and safety precautions to limit worker exposure to contamination should be taken when working in any excavations on Site.

4.3 Groundwater Analytical Summary

Groundwater samples were collected from the five temporary monitoring wells, identified DP-1 through DP-5. The locations of the temporary wells were chosen based on the assumed direction of groundwater flow (inferred from a topographic map of the area) and were placed on the Site boundaries to determine what contamination is moving onto or off of the Site. A summary of the detected constituents is presented in Table 6 and on Figure 5, the data validation report is included as Appendix B, and the complete laboratory analytical reports are included as Appendix C.

4.3.1 Analytical Results

Laboratory analysis of the groundwater samples indicates the presence of the VOCs in each of the temporary monitoring wells. The VOCs detected were DCE, ethylbenzene, isopropylbenzene (cumene), MEK, m- and p-xylene, 4-isopropyltoluene, trichloroethene (TCE), PCE, and toluene. Most of the detections were at estimated levels, the exceptions are TCE in DP-2 and PCE in all wells.

PCE was detected in all of the wells and ranged in concentration from 0.94 J micrograms per liter (ug/L) to 2,700 ug/L. TCE was detected in each well except DP-3, the concentrations ranged from 0.78 J ug/L to 9 J ug/L. DCE was detected in three wells at estimated concentrations ranging from 0.32 J ug/L to 40 J ug/L. The high concentrations of PCE, TCE, and DCE were detected in DP-5, the values for TCE and DCE were estimated due to elevated detection limits resulting from sample dilution. The sample was diluted due to the concentration of PCE.

4.3.2 Extent of Groundwater Contamination

Organic constituents were detected in all five temporary monitoring wells at the Site. The concentrations of the detected constituents were compared to their respective MCL (as stated in the decision rule in the DQOs). Two of the constituents (cumene and MEK) did not have an established MCL, so the RSL for tapwater was used for the comparison. One constituent, 4-isopropyltoluene, did not have an established MCL or RSL for tapwater. The detections of PCE exceeded the MCL in four of the temporary wells, three of the shallow wells and the deep well. The temporary well that did not exceed the MCL for PCE is DP-3. TCE exceeded the MCL in one well (DP-4). None of the other detected contaminants exceeded the MCL. Since TCE and PCE exceed the MCLs, further investigation and possibly remediation of the groundwater may be required before redevelopment of the property can proceed.

The shallow temporary wells (DP-1 through DP-4) were installed around the perimeter of the Site to provide for lateral delineation and to determine what may be migrating onto and off of the Site. Elevated concentrations of PCE (ranging from 350 ug/L to 2,700 ug/L) were observed in three of the four boundary wells. Either multiple source areas exist on the Site, or PCE is migrating both onto and off of the Site. The concentrations observed in DP-4 are of particular interest. The highest concentrations of the detected chlorinated organics during this investigation were in DP-4. This temporary monitoring well was located on the southwest boundary of the Site and was cross-gradient of the suspected source area based on the inferred groundwater flow direction. Either groundwater flows in more of a westerly direction and this location is downgradient of the former source area, or high concentrations of contaminants are migrating onsite from an offsite source area.

Deep well DP-5 was installed in the area of the shallow temporary monitoring well (GW-1) that was installed and sampled during the 2008 Ahlberg Engineering, Inc. site assessment. This temporary well was installed to provide vertical delineation of the contamination observed in GW-1. The level of PCE observed in DP-5 (160 ug/L) was several orders of magnitude lower than the concentration observed in GW-1 (12,000 ug/L). TCE (41 ug/L), DCE (21 ug/L), and vinyl chloride (14 ug/L) were also detected in GW-1. Vinyl chloride was not detected in DP-5, and TCE (1.6 J ug/L) and DCE (1.5 J ug/L) were detected at estimated levels. This indicates that the bedrock is unlikely to have been seriously affected by the analytes, although low levels could be present in the bedrock.

Permanent monitoring wells and aquifer performance tests (e.g., slug testing) would be needed to establish the average annual groundwater flow rate and direction. This would provide an indication of which areas have likely been affected by onsite activities, which areas have likely been affected by off-site activities, and how far the contamination may have migrated from the Site.

5 VAPOR INTRUSION SCREENING MODEL

Vapor intrusion screening was performed for the analytes detected in soil and groundwater. The screening was performed using two implementations of the Johnson-Ettinger Vapor Intrusion Model. The first model is the USEPA Ecosystems Research Division (ERD) web based Screening-Level Johnson and Ettinger Model. The second model is the USEPA Office of Solid Waste and Emergency Response (OSWER) Microsoft Excel based Screening-Level Johnson and Ettinger Model. A link to both of the models is included in the references section, a brief discussion of each of the implementations is presented below.

5.1 ERD Model

The ERD implementation of the model allows for a reverse calculation for estimating target media concentrations with a limited sensitivity analysis, a forward calculation for estimating hazard quotients and cancer risk factors with a limited sensitivity analysis, and a full uncertainty analysis for multiple unknown parameters. Only the reverse calculation for estimating target media concentrations was used for this analysis. The model calculates target analyte concentrations for groundwater and soil-gas. The limited sensitivity analysis is performed by using different soil moisture content and depth to contamination estimates to produce the best estimate, a less conservative estimate, and a more conservative estimate. The best estimate uses the depth of contamination input by the user and the likely assumed moisture content for the type of soil. The more conservative estimates (more protective) are produced by using the highest assumed moisture content for the soil and the shallowest depth to contamination (based on an uncertainty interval).

Since the model does not calculate target soil concentrations, the model was only used to generate screening numbers for the analytes detected in groundwater. A reverse calculation was performed for each of the analytes detected in groundwater except 4-isopropyltoluene. A calculation could not be performed for that analyte because it is not included in the list of analytes for which the model can be run.

The user inputs to the model include building type, analyte, soil type, average soil or groundwater temperature, depth to contamination, and an uncertainty interval for depth to contamination. The calculations were performed assuming that any future structure would be built on slab. The remaining inputs were based on site specific information that was either obtained during the investigation or estimates that are typical for the area of the Site.

The depth to contamination was set at the average top of screen interval for the shallow temporary wells, the uncertainty parameter was set at plus or minus 10 feet to coincide with the average depth to water observed in the shallow temporary wells (approximately 30 ft bgs) after they had been allowed to equilibrate. The average groundwater temperature was set at 17 degrees Celsius ($^{\circ}\text{C}$) which is typical of the Atlanta area. The soil type was set as loam. This selection was the closest match to the predominant soil

type observed during drilling (a reddish-brown lean silt, Unified Soil Classification System [USCS] soil type ML).

The model produces estimates of the chemical properties, the soil properties, the building properties, and the exposure parameters based on the above inputs. These estimates can be edited before performing the calculation for the target media concentrations, but they were not edited for this limited screening. The target concentration for the analyte is calculated for a best estimate, a less protective estimate, and a more protective estimate based on the inputs. The results of the modeling are included in Table 7. The model summary sheets for each parameter are included in Appendix D.

5.2 OSWER Model

The OSWER implementation of the model allows for a reverse calculation for estimating target media concentrations and a forward calculation for estimating hazard quotients and cancer risk factors. Only the reverse calculation for estimating target media concentrations was used for this analysis. The model calculates target analyte concentrations for groundwater, soil, and soil-gas.

The model was only used to generate screening numbers for the analytes detected in soil since the ERD model could not be used. The model does not automatically perform a sensitivity analysis, but model runs were performed for two assumed depths to contamination to perform a limited sensitivity analysis for that parameter.

The user inputs to the model include depth below grade to bottom of enclosed floor space, analyte, soil type, and depth to contamination. The depth below grade to bottom of enclosed floor space can be one of two values, 15 centimeters (cm) for buildings on slab and 200 cm for buildings constructed with a basement. The calculations were performed assuming that any future structure would be built on slab (i.e., depth below grade to bottom of enclosed floor space was set to 15 cm). The remaining inputs were based on site specific information that was either obtained during the investigation or estimates that are typical for the area of the Site.

The depth to contamination was set at the average soil sample depth (approximately 857cm) for one calculation and an assumed depth of 305 cm (approximately 10 ft) for a second more conservative calculation. The soil type was set as USCS soil type L. This selection was the closest match to the predominant soil type observed during drilling.

The model produces estimates of the chemical properties, the soil properties, the building properties, and the exposure parameters based on the above inputs and a target concentration is calculated. The average soil temperature is assumed by the model to be 10 °C, this value could not be changed. The results of the modeling are included in Table 8. The model summary sheets for each parameter are included in Appendix D.

5.3 Screening Results

The model outputs were compared to the average observed concentrations in soil or groundwater for each analyte. The average concentrations (rounded to two significant figures) are presented in the modeling results tables (Tables 7 and 8). Screening results that are exceeded by the average concentration are highlighted with bold font.

The screening results for the analytes detected in groundwater are typically orders of magnitude higher than the average concentration calculated for the analyte. The exceptions are PCE and TCE. The average concentrations for these analytes (710 ug/L and 2.5 ug/L, respectively) exceeded all of the screening values calculated by the ERD model (ranging from 1.9 ug/L to 5.6 ug/L and 0.78 ug/L to 2.4 ug/L, respectively). This limited screening indicates that PCE and TCE in groundwater could pose an exposure risk via the vapor intrusion pathway in buildings constructed on the Site. Further evaluation of the health risks or corrective actions (such as vapor barriers) may be required before or as a part of redevelopment.

The screening results for the analytes detected in soil are typically orders of magnitude higher than the average concentration calculated for the analyte. The exception is PCE. The average concentration for this analyte was 450 ug/kg, this exceeded the conservative screening value (0.72 ug/kg) and the less conservative screening value (1.9 ug/kg) calculated by the OSWER model. This limited screening indicates that PCE in soil could pose an exposure risk via the vapor intrusion pathway in buildings constructed on the Site. Further evaluation of the health risks or corrective actions (such as vapor barriers) may be required before or as a part of redevelopment.

6 SUMMARY AND RECOMMENDATIONS

6.1 Soil Assessment Summary

Eight surface soil samples were collected from four borings areas across the Site. The eight soil samples were analyzed for VOCs (8260B). VOCs were detected in all of the soil samples. The VOCs detected were acetone, DCE, MEK, and PCE. Acetone and MEK were only detected at estimated levels and may be a laboratory artifact. DCE was detected in one sample and PCE was detected in six samples. Based on the results of the soil investigation conducted at the Site, it is apparent that PCE contamination is present across the Site. Only the samples from boring SB-3 did not contain PCE.

The average concentration of each detected analyte was compared to USEPA RSLs for industrial soil (as stated in the decision rule in the DQOs) to determine if the Site should be considered contaminated. None of the average concentrations exceed the respective RSL. Therefore, the levels of contamination detected in the soils during this assessment are not considered to present a threat to human health if the Site is redeveloped for industrial use.

6.2 Groundwater Assessment Summary

Groundwater samples were collected from the five temporary monitoring wells, identified DP-1 through DP-5. Organic constituents were detected in all five temporary monitoring wells at the Site. The concentrations of the detected constituents were compared to their respective MCL (as stated in the decision rule in the DQOs), or to the RSL for tapwater if no MCL was established. One constituent, 4-isopropyltoluene, did not have an established MCL or RSL for tapwater. The detections of PCE exceeded the MCL in four of the temporary wells, three of the shallow wells and the deep well. The temporary well that did not exceed the MCL for PCE is DP-3. TCE exceeded the MCL in one well (DP-4).

The shallow temporary wells (DP-1 through DP-4) were installed around the perimeter of the Site to provide for lateral delineation and to determine what may be migrating onto and off of the Site. Elevated concentrations of PCE (ranging from 350 ug/L to 2,700 ug/L) were observed in three of the four boundary wells. Either multiple source areas exist on the Site, or PCE is migrating both onto and off of the Site.

Deep well DP-5 was installed to provide vertical delineation for the shallow temporary monitoring well (GW-1) that was installed and sampled during the February 2008 Ahlberg Engineering, Inc. site assessment. The levels of contaminants observed in DP-5 were orders of magnitude below those observed in GW-1. The results indicate that the bedrock is unlikely to have been seriously affected by the analytes, although low levels could be present in the bedrock.

6.3 Vapor Intrusion Screening Summary

Vapor intrusion screening was performed for the analytes detected in soil and groundwater. The screening was performed using two implementations of the Johnson-

Ettinger Vapor Intrusion Model. The first model is the USEPA ERD web based Screening-Level Johnson and Ettinger Model, this implementation was used to generate screening values for the analytes detected in groundwater. The second model is the USEPA OSWER Microsoft Excel based Screening-Level Johnson and Ettinger Model, this implementation was used to generate screening values for the analytes detected in soil.

The model outputs were compared to the average observed concentrations in soil or groundwater for each analyte. The screening results for the analytes detected in groundwater are typically orders of magnitude higher than the average concentration calculated for the analyte. The exceptions are PCE and TCE. The average concentrations for these analytes (710 ug/L and 2.5 ug/L, respectively) exceeded all of the respective screening values calculated by the ERD model (ranging from 1.9 ug/L to 5.6 ug/L and 0.78 ug/L to 2.4 ug/L, respectively). The screening results for the analytes detected in soil are typically orders of magnitude higher than the average concentration calculated for the analyte. The exception is PCE. The average concentration for this analyte was 450 ug/kg, this exceeded the conservative screening value (0.72 ug/kg) and the less conservative screening value (1.9 ug/kg) calculated by the OSWER model.

This limited screening indicates that PCE and TCE in groundwater and that PCE in soil could pose an exposure risk via the vapor intrusion pathway in buildings constructed on the Site.

6.4 Recommendations

The following recommendations are made based on the data collected during this Targeted Brownfield Assessment and the conclusions drawn from that data about the extent of contamination in the soil and groundwater at the Site and the possibility for vapor intrusion to pose a risk to human health at the Site.

- Concentrations of two contaminants (PCE and TCE) in groundwater exceed the MCL, further assessment should be performed to determine site specific risk-based screening/clean-up levels for these analytes.
- Analyte concentrations in both soil and groundwater could pose an exposure risk via the vapor intrusion pathway. More detailed evaluations of the health risks should be performed prior to redevelopment of the Site or engineering controls to address the exposure risk should be implemented as a part of the redevelopment of the Site.

7 REFERENCES.

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United States Army Corps of Engineers (USACE), *Engineering Manual EM 1110-1-4000 Monitoring Well Design, Installation, and Documentation at Hazardous Waste Sites*, May 1990.

USACE, *Quality Assurance Project Plan (QAPP) for Former Duluth Dry-cleaning Site Brownfield Site Investigation*, March 2010.

United States Environmental Protection Agency (USEPA), *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846 Third Edition) Including Update IV*, Washington, DC, June 1997.

USEPA, *Quality Assurance Guidance for Conducting Brownfields Site Assessments*, EPA 540-R-98-038, Washington DC, September 1998.

USEPA, *Field Branches Quality System and Technical Procedures*, Athens, GA, November 2007.

USEPA, *USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review*, EPA 540-R-08-01, Washington DC, June 2008.

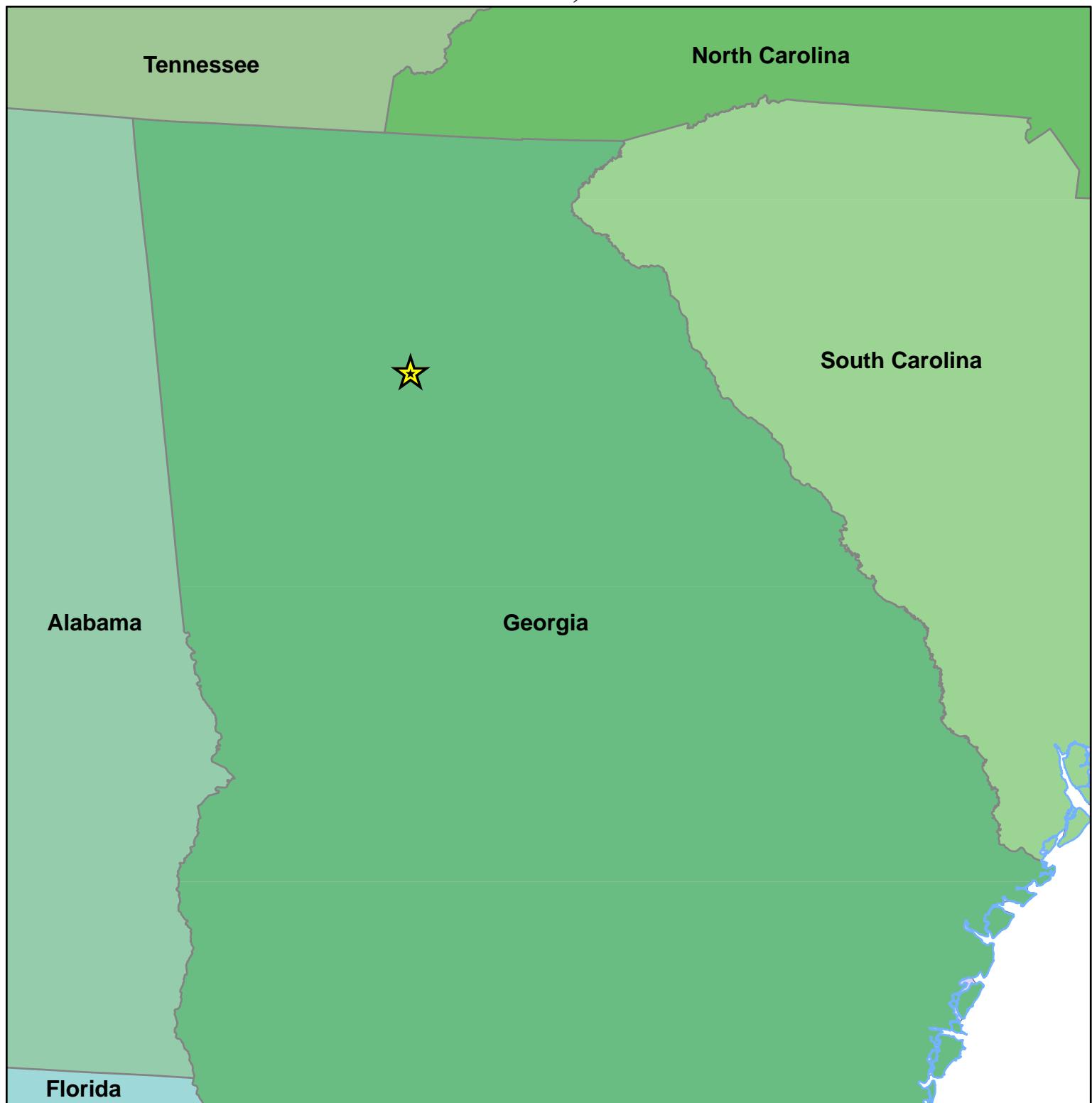
USEPA, *Screening Level Implementation of the Johnson and Ettinger Vapor Intrusion Model*, as available June 2010, http://epa.gov/athens/learn2model/part-two/onsite/JnE_lite.html.

USEPA, *Johnson and Ettinger (1991) Model for Subsurface Vapor Intrusion into Buildings*, as available June 2010, http://www.epa.gov/oswer/riskassessment/airmodel/johnson_ettinger.htm.

FIGURES

Figure 1 Site Location

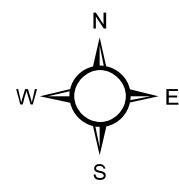
Duluth, GA



**L
E
G
E
N
D**



Site Location



0 15 30



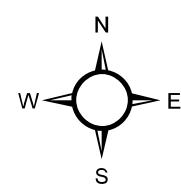
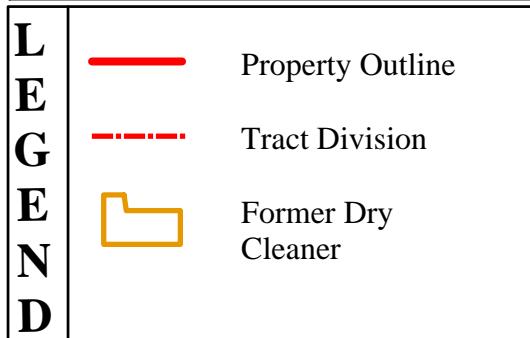
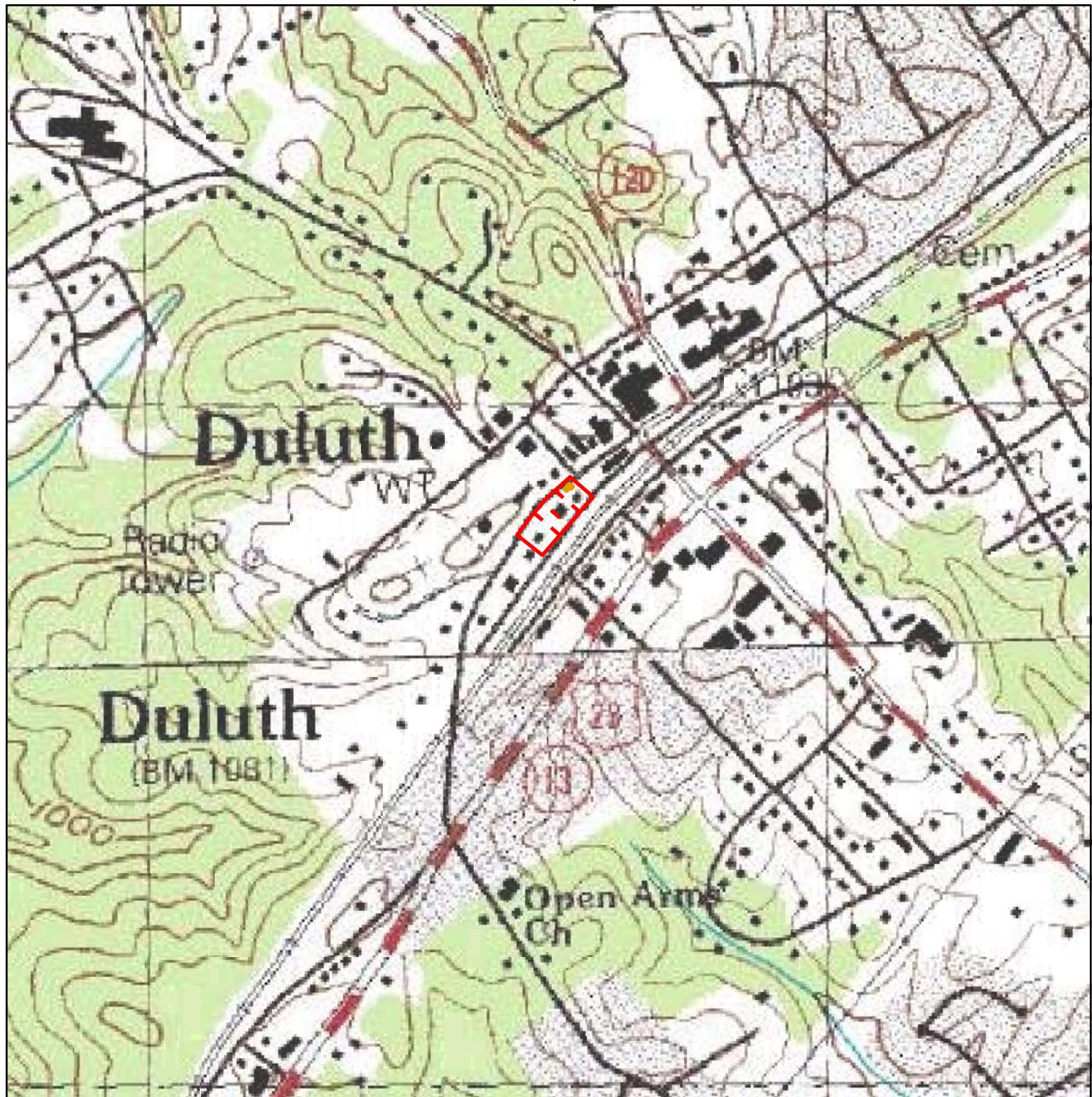
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

60 90 120

Miles

JUNE 2010

Figure 2 Site Topography
Duluth, GA



0 0.2 0.4 0.8 1.2 1.6 Miles



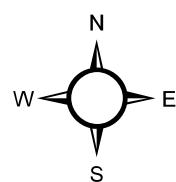
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

JUNE 2010

Figure 3 Site Layout
Duluth, GA



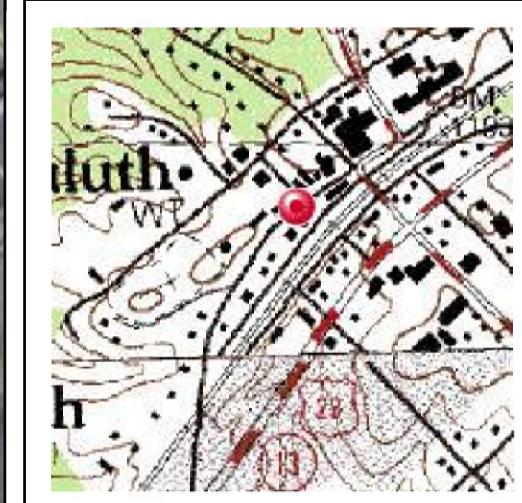
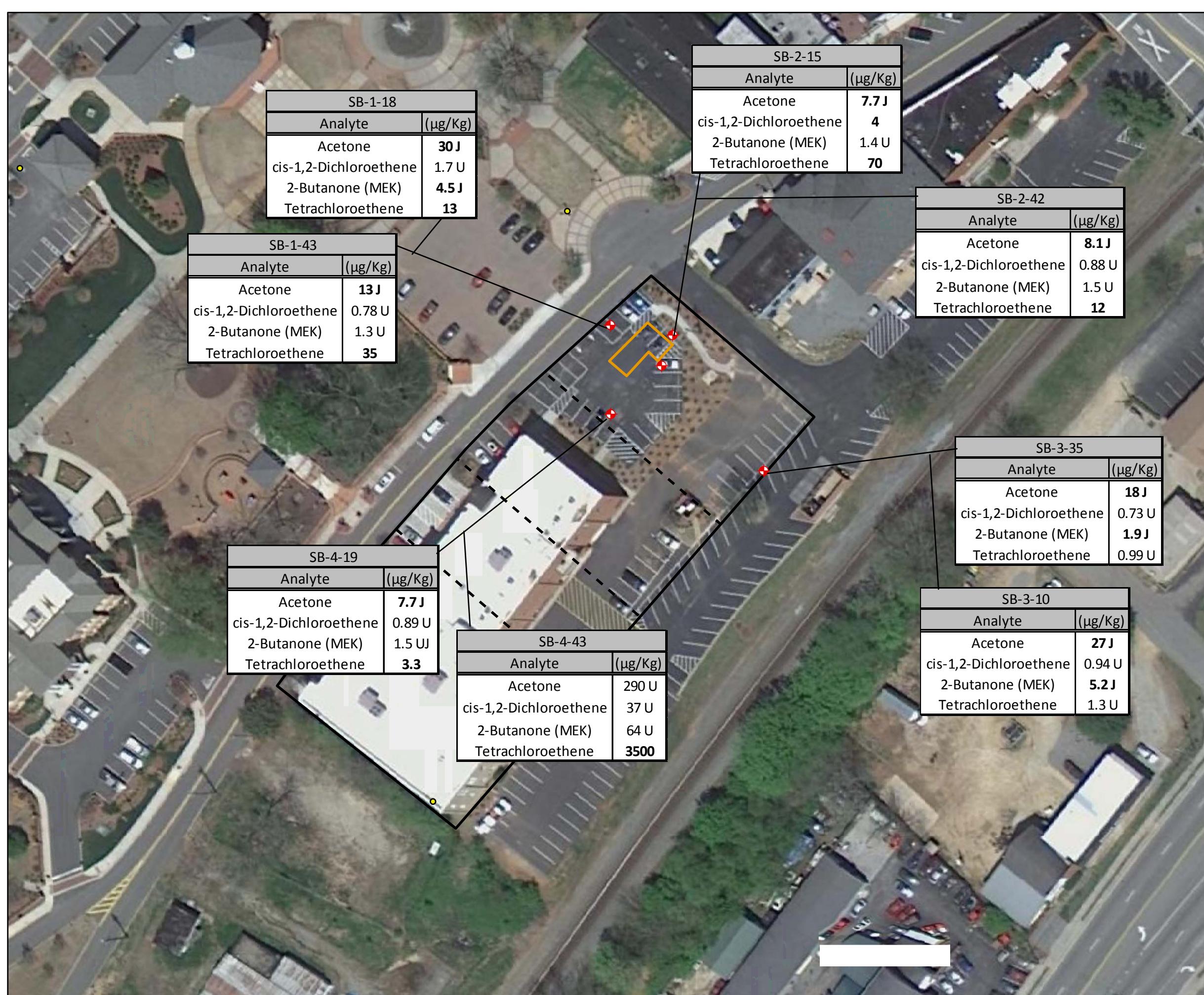
L	Property Outline
E	Tract Division
G	Former Dry
E	Cleaner
N	Well Location
D	



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0 90 180 360 540 720 Feet

JUNE 2010



L
E
G
E
N
D

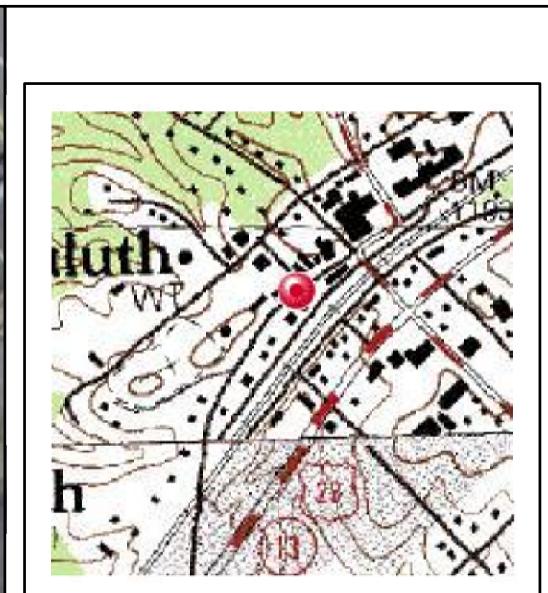
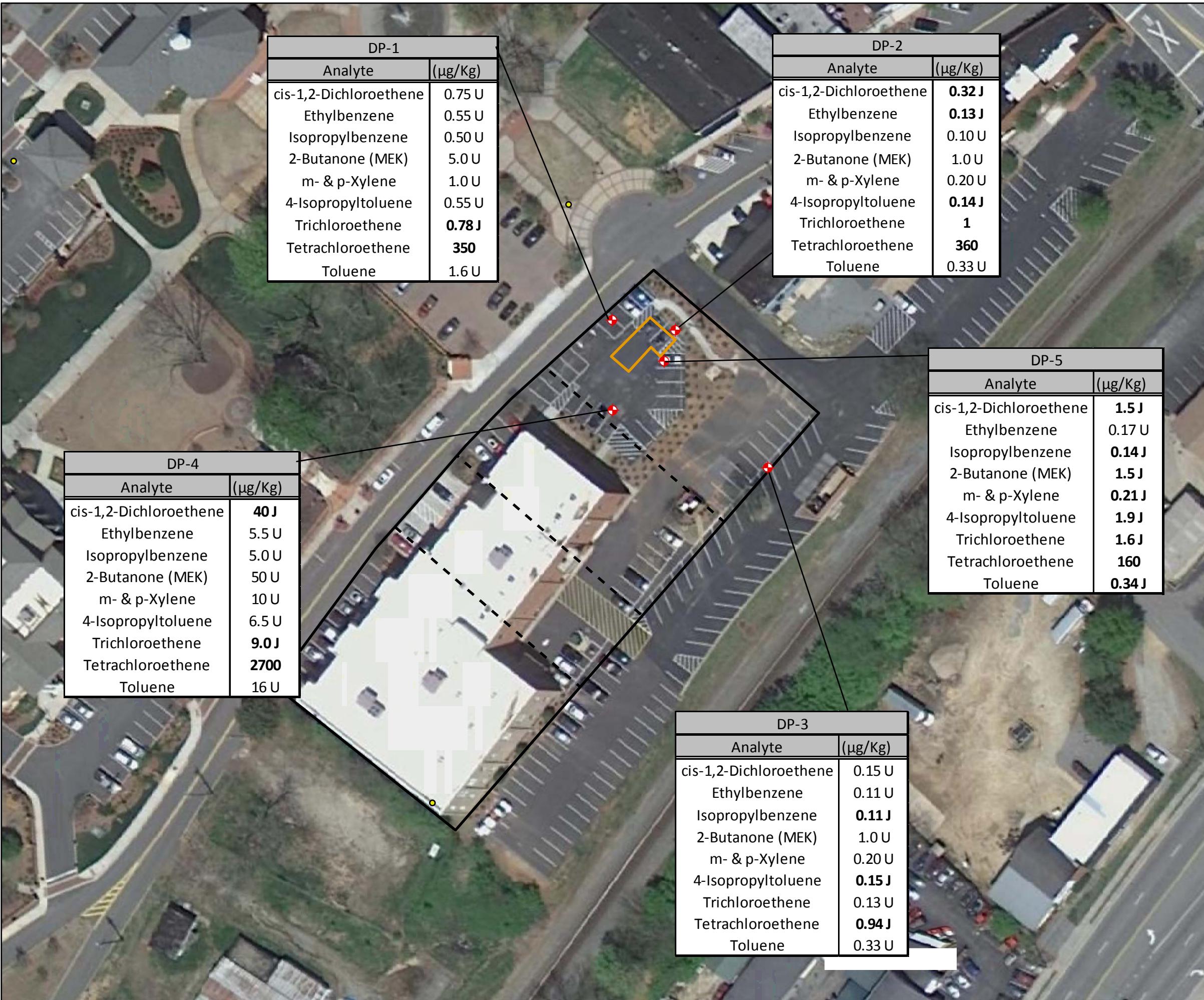
- Property Outline
- Tract Division
- Former Dry Cleaner
- Well Location

1 inch = 266 feet
 0 145 290 580' N

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
SAVANNAH, GEORGIA

SOIL ANALYTICAL RESULTS
SHALLOW & DEEP SOIL SAMPLES

DULUTH, GA



TABLES

TABLE 1
DATA QUALITY OBJECTIVES

Data Quality Objective	Project Specific Action
Problem Statement	Is the Site property safe for reuse as a commercial development?
Identify the Decision	What is the extent of the contamination? Does the site soil or groundwater contain VOCs at levels that pose a threat to the environment or to human health either through direct exposure or vapor intrusion if the site is developed for commercial use?
Identify Inputs to the Decision	Five groundwater samples will be analyzed for VOCs (8260B). The maximum contaminant levels (MCLs) established for drinking water will be used for comparison to ground water. Eight Soil samples will be analyzed for VOCs (8260B). The arithmetic average of each constituent concentration will be compared to USEPA Residential Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites (USEPA December, 2009). The arithmetic average of constituent concentrations in groundwater and soils will also be used to perform a limited (i.e., conservative estimates of unknown site specific data) screening tool for possible vapor intrusion at levels that could pose a threat to human health.
Define the Boundaries of the Study	Five temporary shallow groundwater monitoring wells will be installed and sampled. Eight soil samples will be collected from the interval exhibiting the highest PID values and from just above the water table in each of the four shallow borings. The USEPA's web based Johnson and Ettinger model will be used for vapor intrusion modeling.
Develop a Decision Rule	If analytes are detected in ground water at concentrations above the MCLs, further delineation and/or remediation of the ground water may be required. If the average levels of any analytes detected in soils as VOCs are less than the RSLs, then the development of the property can proceed. If these analytes exceed RSLs, further investigation and remediation may be required before development of the property. If the average constituent concentrations in soil or groundwater are at levels such that the vapor intrusion modeling indicates possible health risks, then further evaluation of the health risks or corrective actions (such as vapor barriers) may be required before or as a part of the redevelopment.
Specify Limits on Decision Errors	Since variance of the data cannot be accurately estimated at this time and the number of samples is restricted by financial considerations, a confidence limit for the data cannot be established. Comparing average levels of analytes to Residential RSLs and using the average levels in the vapor intrusion modeling will reduce decision errors.

TABLE 2
SAMPLING SUMMARY

Sample ID	Date	Time	Screen Point Interval	Soil Sample Interval	Soil Type	PID (PPM)	Comments
SB-1-18	03/25/2010	1305	N/A	18.0 - 18.5	ML	10.4	
SB-1-43	03/25/2010	1505	N/A	42.5 - 43.0	ML	0.8	BLK1 @ 1515
DP-1	03/26/2010	1240	40.9 - 44.9	N/A	N/A	N/A	
SB-2-15	03/26/2010	1040	N/A	15.0 - 15.5	ML	10.4	
SB-2-42	03/26/2010	1105	N/A	40.5 - 41.0	ML	20.9	
DP-2	03/26/2010	1255	40.9 - 44.9	N/A	N/A	N/A	
SB-3-10	03/26/2010	1520	N/A	9.5 - 10.0	ML	0	
SB-3-35	03/26/2010	1545	N/A	34.5 - 35.0	ML	0	
DP-3	03/26/2010	1615	34.9 - 38.9	N/A	N/A	N/A	BLK2 @ 1630; MS/MSD Taken
SB-4-19	03/26/2010	1340	N/A	18.5 - 19.5	ML	3.5	MS/MSD Taken
SB-4-43	03/26/2010	1420	N/A	42.5 - 43.0	ML	15.4	DUP1 @ 1300
DP-4	03/26/2010	1440	40.9 - 44.9	N/A	N/A	N/A	
DP-5	03/26/2010	945	61.7 - 65.7	N/A	N/A	N/A	DUP2 @ 1100

Notes:

Sample intervals are reported in feet below ground surface.

Soil type given is the Unified Soil Classification System Soil Type.

BLK1/BLK2 = Rinsate blanks.

MS/MSD = Matrix spike/matrix spike duplicate.

DUP1/DUP2 = Field duplicate samples.

PID = Photoioization detector.

PPM = Parts per million.

N/A = Not applicable.

Site Name: Former Duluth Drycleaner
Site Location: Duluth, Georgia

Revision Number:00
Revision Date: 07/07/10

TABLE 3
SURVEY DATA

Boring/Screen Point Location Name	Coordinates*		Elevation**
	Northing	Easting	
SB-1/DP-1	1455887.95	2302971.41	1093.86
SB-2/DP-2	1455885.98	2303006.50	1093.52
SB-3/DP-3	1455787.87	2303066.31	1085.78
SB-4/DP-4	1455830.08	2302968.39	1093.88
DP-5	1455859.64	2303002.44	1093.73

Notes:

* Coordinates are given in Georgia State Plane West 1002.

** The elevation at the Measuring Point was estimated at 1094.00 feet mean sea level (MSL). The estimate was obtained from Duluth CityPlanning GIS and is within 2 feet of actual elevation.

Site Name: Former Duluth Drycleaner
 Site Location: Duluth, Georgia

Revision Number:00
 Revision Date: 07/07/10

TABLE 4
 QA/QC SAMPLE SUMMARY

Matrix	Field Samples	Duplicate Sample	Rinsate Blanks ¹	Trip Blanks ²	MS Samples	MSD Samples	Total Number of Samples	Analytical Procedure	DQO Level	Holding Time	Preservation	Sample Cntnrs	Total Cntnrs
	Former Duluth Drycleaning Site												
SOIL	8	1		1	1	11	VOCs	SW-846	EPA 8260/5035	Definitive Data	14 days	NaHSO ₄ CH ₃ OH	2 x 40-mL ³ 1 x 40-mL
AQUEOUS	5	1	2	1	1	11	VOCs	SW-846	EPA 8260B	Low Level Definitive Data	14 days	HCl to pH < 2 Ice to 4° C	VOC vials VOC vials

Notes:

¹Rinsate blanks for soil samples are aqueous samples and the containers needed are included in the aqueous field blank column.

²The trip blanks for the soil field blanks are included in the ground-water trip blank totals.

³A 4-oz jar is also required per sample to perform percent moisture.

Site Name: Former Duluth Drycleaner
Site Location: Duluth, Georgia

Revision Number:00
Revision Date: 07/07/10

TABLE 5
SOIL ANALYTICAL SUMMARY

Analyte	SB-1-18	SB-1-43	SB-2-15	SB-2-42	SB-3-10	SB-3-35	SB-4-19	SB-4-43*	Average **	RSL
Acetone	30 J	13 J	7.7 J	8.1 J	27 J	18 J	7.7 J	290 U	32	6.3E+08
cis-1,2-Dichloroethene	1.7 U	0.78 U	4.0	0.88 U	0.94 U	0.73 U	0.89 U	37 U	3.2	1.0E+07
2-Butanone	4.5 J	1.3 U	1.4 U	1.5 U	5.2 J	1.9 J	1.5 UJ	64 U	5.8	2.0E+08
Tetrachloroethene	13	35	70	12	1.3 U	0.99 U	3.3	3500	450	2.6E+03

Notes:

All results are micrograms per kilogram (ug/kg).

Only two significant figures are shown.

Detections are highlighted with bold font.

* = The result is the average of the parent and the duplicate sample. If the analyte was detected in only one of the samples, then 1/2 the method detection limit was used in the calculation. If both samples were non-detect then the lower detection limit is reported.

** = The average includes using 1/2 the method detection limit in the calculation for samples that were non-detect for the target analyte.

J = Estimated value.

U = Non-detect at the stated level.

UJ = Non-detect at the estimated level.

RSL = the United States Environmental Protection Agency Region Screening Level for industrial soil.

TABLE 6
 GROUNDWATER ANALYTICAL SUMMARY

Analyte	DP-1	DP-2	DP-3	DP-4	DP-5*	Average **	MCL
cis-1,2-Dichloroethene	0.75 U	0.32 J	0.15 U	40 J	1.5 J	8.5	7.0E+01
Ethylbenzene	0.55 U	0.13 J	0.11 U	5.5 U	0.17 U	0.66	7.0E+02
Isopropylbenzene	0.50 U	0.10 U	0.11 J	5.0 U	0.14 J	0.6	6.8E+02 ^
2-Butanone (MEK)	5.0 U	1.0 U	1.0 U	50 U	1.5 J	6.0	7.1E+03 ^
m- & p-Xylene	1.0 U	0.20 U	0.20 U	10 U	0.21 J	1.2	1.0E+04
4-Isopropyltoluene	0.55 U	0.14 J	0.15 J	6.5 U	1.9 J	1.1	NE
Trichloroethene	0.78 J	1.0	0.13 U	9.0 J	1.6 J	2.5	5.0E+00
Tetrachloroethene	<u>350</u>	<u>360</u>	0.94 J	<u>2700</u>	<u>160</u>	710	5.0E+00
Toluene	1.6 U	0.33 U	0.33 U	16 U	0.34 J	1.9	1.0E+03

Notes:

All results are micrograms per kilogram (ug/L).

Only two significant figures are shown.

Detections are highlighted with bold font.

MCL = United States Environmental Protection Agency (USEPA) Maximum Contaminant Level for tapwater.

Exceedances of the MCL are underlined.

* = The result is the average of the parent and the duplicate sample. If the analyte was detected in only one of the samples, then 1/2 the method detection limit was used in the calculation.

** = The average includes using 1/2 the method detection limit in the calculation for samples that were non-detect for the target analyte.

^ = value given is the USEPA Regional Screening Level for tapwater because no MCL is established.

J = Estimated value.

U = Non-detect at the stated level.

NE = No MCL or RSL is established.

TABLE 7
 VAPOR INTRUSION SCREENING RESULTS FOR GROUNDWATER

Analyte	Model Estimate Type			Average Concentration *
	Less Conservative	Best Estimate	More Conservative	
cis-1,2-Dichloroethene	9.3E+03	3.7E+03	2.8E+03	8.5E+00
ethylbenzene	3.5E+02	1.5E+02	1.1E+02	6.6E-01
Isopropylbenzene	5.7E+02	2.5E+02	2.0E+02	6.1E-01
2-Butanone (MEK)	1.1E+07	2.8E+06	1.1E+06	6.0E+00
m- & p-Xylene	solubility	solubility	solubility	1.2E+00
4-Isopropyltoluene	NC	NC	NC	1.1E+00
Trichloroethene	2.4E+00	9.9E-01	7.8E-01	2.5E+00
Tetrachloroethene	5.6E+01	2.4E+01	1.9E+01	7.1E+02
Toluene	6.1E+04	2.6E+04	2.0E+04	1.9E+00

Notes:

All values are micrograms per kilogram (ug/L).

Only two significant figures are shown.

Modeled values that are exceeded by the average concentration
 are highlighted with bold font.

* = The average includes using 1/2 the method detection limit in the
 calculation for samples that were non-detect for the target analyte.

solubility = the calculated value exceeds the solubility limit for the analyte.

NC = Not calculated.

The more conservative estimates (more protective) are produced by using the highest
 assumed moisture content and the shallowest depth to contamination.

The less conservative estimates (less protective) are produced by using the lowest
 assumed moisture content and the deepest depth to contamination.

Site Name: Former Duluth Drycleaner
Site Location: Duluth, Georgia

Revision Number:00
Revision Date: 07/07/10

TABLE 8
VAPOR INTRUSION SCREENING RESULTS FOR SOIL

Analyte	Modeled Depth to Contamination		Average Concentration *
	305 cm	857 cm	
Acetone	3.3E+04	8.1E+04	3.2E+01
cis-1,2-Dichloroethene	9.4E+01	2.4E+02	3.2E+00
2-Butanone (MEK)	5.2E+05	1.3E+06	5.8E+00
Tetrachloroethene	7.2E-01	1.9E+00	4.5E+02

Notes:

All values are micrograms per kilogram (ug/kg).

Only two significant figures are shown.

Modeled values that are exceeded by the average concentration
are highlighted with bold font.

* = The average includes using 1/2 the method detection limit in the
calculation for samples that were non-detect for the target analyte.

APPENDIX A

FIELD DATA



**U.S. ARMY CORPS OF ENGINEERS
SAVANNAH DISTRICT
GEOLOGY and HYDROGEOLOGY**

**SOIL SAMPLE LOG
DATA SHEET**

Client: Duluth, Georgia

Sampled By: Tracey Tapley

Location/Project: Former Duluth Dry Cleaning Site

Method: Macrocore

Drill Rig: Geoprobe 66DTR

Sample Analysis (Preservative): 8260B (MeOH, NaHSO4, & Ice) for soil samples; 8260B (HCl) for screen point samples

Number of Jars per Analysis: 4-8260B (Rinsate Blank consists of 3-8260B (HCl))

Sample ID	Date	Time	Total Sample Jars	Sample Depth (Feet)	Soil Classification	PID (PPM)	Duplicate	Field Blank	Comments
SB-1-18	03/25/2010	1305	4	18.0 - 18.5	ML	10.4	No	No	
SB-1-43	03/25/2010	1505	4	42.5 - 43.0	ML	0.8	No	Yes	BLK1 @ 1515
DP-1	03/26/2010	1240	3	40.9 - 44.9	N/A	N/A	No	No	
SB-2-15	03/26/2010	1040	4	15.0 - 15.5	ML	10.4	No	No	
SB-2-42	03/26/2010	1105	4	40.5 - 41.0	ML	20.9	No	No	
DP-2	03/26/2010	1255	3	40.9 - 44.9	N/A	N/A	No	No	
SB-3-10	03/26/2010	1520	4	9.5 - 10.0	ML	0	No	No	
SB-3-35	03/26/2010	1545	4	34.5 - 35.0	ML	0	No	No	
DP-3	03/26/2010	1615	9	34.9 - 38.9	N/A	N/A	No	Yes	BLK2 @ 1630; MS/MSD Taken
SB-4-19	03/26/2010	1340	12	18.5 - 19.5	ML	3.5	No	No	MS/MSD Taken
SB-4-43	03/26/2010	1420	4	42.5 - 43.0	ML	15.4	Yes	No	DUP1 @ 1300
DP-4	03/26/2010	1440	3	40.9 - 44.9	N/A	N/A	No	No	
DP-5	03/26/2010	945	3	61.7 - 65.7	N/A	N/A	Yes	No	DUP2 @ 1100

Notes:

1. The notation "DP" indicates screen point samples.

2. N/A: Not applicable

Duluth, Minn., 3/20/66
Former Duluth Iron Working
Site

Mark Cook 671-03817
CE 777-943-6782

John Malone 671-89119

Steam Cleaning

Tracy Taylor 663-0226F

Dice Carter wants 1/400

6

Location: Duluth, GA Date: 2/20/00
 Project / Client: ~~Former Triple Creek, GA~~
SP-1

Depth PDSat Depth Record Time PID or
 0 C 38 0.9 Nov 1 C
 2.5 C 29.5 1.0 Nov 1 C
 4.5 C 29.5 0.8 Nov 1 C
 5.5 C 29.5 0.2 Nov 1 C
 8 2.1
 9.5 4
 10.5 6
 12 1.2
 14.5 2.2
 16.5 6
 18 12.4
 19.5 3.9
 20.5 3.8
 22 C
 24.5 2.2 PDS Calibration
 26.5 0.9
 28.5 C
 29.5 2.7
 30.5 C
 35.5 4.6

Location: _____ Date: _____
 Project / Client: _____

Depth Scan Log	
0	ML with flat back bar, less than 10' away from the boat bridge base.
4.3	WST
4.9	SC with clavus sand
5.5	SC
6.5	SC
7.5	SC
8.5	SC
10.5	SC
12.5	SC
13.5	SC
14.5	SC
16.5	SC
18.5	SC
19.5	SC
20.5	SC
22	C
24.5	2.2 PDS Calibration
26.5	0.9
28.5	C
29.5	2.7
30.5	C
35.5	4.6
SB-1-18	18-18.5 180.5
SB-1-43	22.5-43 180.5
PALEA	181.5

Dakith, CA 3/26/10
Former Dakith Drift Dredging Co.
DP-5 RD #1115 101

Time D10 sec.
830 0
848 0
900 0
915 0
930 0
945 0
1000 0 pulling grade
1015 0 break

Released @ 69

stop 3.2
65.8

~~4.2~~ -1
~~65.7~~ Bottom of screen
4.0
~~64.7~~ top of screen

Pulled up 35
green exposed

DP-5 945
DP-2 1160

Depth P1Dson

15.5 10.4
18 0.9
19.5 2.4
40.5 8.9
43 4.2
44.5 0

Time 8:12:22

18.0 0
18.4 0
19.0 0
1115 0, 1116, 1117

Depth S1m Done | Done
NO change from SE-1

Sample

SB-2-15
SB-2-42

15-15.5 1000
40.5-41 1100

10

Location Trinity Rd, 6A Date 10/10/10
 Project / Client Concerto Job No. DP-2

Time 11:00 AM

Temp 22.4°C
 RH 35%
 Barom 1014.4 Hg
 W/C 26.8

DP-2

1255

Location Trinity Rd, 6A Date 10/10/10 11

Project / Client Concerto Job No. DP-1

Time 11:00 AM

Temp 22.4°C
 RH 35%
 Barom 1014.4 Hg
 W/C 27.6 lbs

DP-1 1246

Duluth, Minn.

Electro

Former Duluth Drilled Co., Inc.

DP-4

Depth (ft.)	Time
155	0
17	2.9
195	3.5
405	9.0
43	15.4
415	5.3

Time	Volts
1315	12600
1530	0
1745	0
1900	0
1945	0
2015	0

DP-4

Time	V.D.
1420	0
1445	0
1500	0

strat. 4.5
punctiform 2.5
granular 0.9 - 1.1
dark 0.6 - 0.5

Depth Significance

No change from DP-1

DP-4 1440

Sample

DP-4-13

Resist.

Volts

Wetted taken

DP-4-13

1420

1420

DP-4-1

1420-13

1360

14

Location Duluth Date 10/10/02
 Project / Client U.S. Army Corps of Engineers

DP 3

Depth FID &
Z-12 O

Time	FID #2	Time	FID #2
1615	O	1600	O
1615	O	1615	O
1645	O	1630	O Done

Step	MSD
Port	25
Avg	25
Starboard	25
Total	75

Sample numbers & locations
Z-12 = 32-21 + 30' fcc

Latitude 46° 5' N
 Longitude 92° 10' W

LK3

DP 3 ~~1600~~ 1615 MS/MSD
 BLK2 1630

SB 3 - 10
Z-12 - 30'

SB 3 - 10
Z-12 - 30'

1620
1630

Duluth, GA

2/26/17

Former Duluth Landfill, SW

Georgia

	Height from Ground	Loc.
MP	4.81	1093.86
SB-1	4.90	1093.86
SB-2	5.29	1093.86
SB-3	13.03	1093.78
SB-4	4.91	1093.86
DP-5	5.08	1093.78

Duluth, GA

2/26/17
Former Duluth Landfill, SW

Georgia

Trimble GPS XA 2007

StatePlane Georgia 102

	N	E
SB-1/DP-1	1485877.72	2302776.41
SB-1/DP-6	1485877.72	2302776.41
SB-2/DP-3	1485877.72	2302776.41
SB-4/DP-4	1485877.72	2302776.41
DP-5	1485877.72	2302776.41

8' hill lower & upper
working

Estimated elevation of 1096
feet from Office of Planning
Gwinnett County Plan
8 feet

APPENDIX B

DATA VALIDATION

1.0 Narrative

Eleven soil and eleven aqueous samples were submitted to TestAmerica (TA) for analysis. The samples submitted and the analyses performed are summarized below. The report generated by the TA for these samples is report number 680-56230-1. The following sections present a brief summary of the non-conformances found utilizing the data validation checklist and the laboratory and field quality assurance / quality control (QA/QC) measures and details what qualifications, if any, are necessary for the data.

1.1 *Chain of Custody (COC) and Field Documentation Review*

The screen points did not make enough water to measure the field parameters. This result is not unexpected, the protocols identified in the Quality Assurance Project Plan (QAPP) were followed.

No qualifications are necessary.

The names were interchanged for the soil and water filed duplicates (DUP1 and DUP2) on the COC. Sample SB-2-41 was listed as SB-2-42 on the COC. The laboratory logged the samples using the name on the COC and not the names on the sample bottles. This action was confirmed with the US Army Corps of Engineers (USACE) QA/QC manager.

No qualifications are necessary.

2.0 Laboratory QA/QC

2.1 *Surrogates*

The surrogate recovery for 4-bromofluorobenzene in sample B-4-43 was biased high. The sample was diluted by a factor of 40. According to the laboratory narrative, the sample was re-extracted or re-analyzed with concurring results so the original results were reported. This sample is also the parent sample for field replicate sample DUP2. The relative percent differences (RPDs) for the detected analytes in the parent and replicate samples were within established guidelines (See Section 3.1).

No qualifications are necessary.

2.2 *Laboratory Control Samples (LCS) and Duplicates (LCSD)*

The LCSD for batch 680-164913 had percent recoveries (PRs) that were outside of established control limits biased low. The PRs for the LCS and the RPDs for the LCS/LCSD pair were within established control limits. The analytes, LCSD PRs, and control limits are:

<u>Analyte</u>	<u>LCSD PR</u>	<u>Control limits</u>
Chlorobenzene	75	77-120
Chloroform	68	65-127
o-xylene	75	76-122

The associated samples were non-detect for the analytes. The quantitation limits should be flagged as estimated (UJ).

2.3 Matrix Spikes (MS) and Duplicates (MSD)

The MS and MSD (680-56230-11) PRs were biased high for 1,1,2,2-tetrachloroethane, 1,2,3-trichloropropene, 1,2-dibromo-3-chloropropane, 2-butanone (MEK), and 4-methyl-2-pentanone (MIBK). The RPDs were within established control limits. The associated LCS was within established guidelines. The associated sample is SB-4-19. The method detection limit (MDL) was flagged as estimated (UJ) by the lab, the reporting limit (RL) was not qualified. Since the recoveries were biased high and the associated sample was non-detect the reporting limit does not need to be qualified.

No qualifications are necessary.

The MS and MSD (680-56230-11) PRs were biased low for naphthalene. The RPD was also outside of established control limits. The associated LCS was within established guidelines. The associated sample is SB-4-19. The method detection limit (MDL) was flagged as estimated (UJ) by the lab, the reporting limit (RL) was not qualified. Since the recoveries were biased low and the associated sample was non-detect the RL should be flagged as estimated.

The RL for naphthalene in sample SB-4-19 should be flagged as estimated (UJ).

The MSD (680-56230-16) PRs were biased low for 1,1,1,2-tetrachloroethane, chlorodibromomethane, and ethylene dibromide. The PR for the MS and the RPD for the MS/MSD pair were within established control limits. The associated LCS was within established guidelines. The associated parent sample is DP-3.

No qualifications are necessary.

2.4 Blanks

2.4.1 Method Blanks

The method blank for batch 680-165125 contained 1,2,4-trichlorobenzene at a tentatively identified level (above the MDL but below the RL). Associated sample DP-5 also contained 1,2,4-trichlorobenzene at a tentatively identified level. The concentration was not greater than 5 times the concentration observed in the blank. The analyte should be reported as non-detect at the reporting limit (U).

The method blank for batch 680-164873 contained n-butylbenzene at a tentatively identified level. Associated samples DP-1 and DP-2 also contained n-butylbenzene at tentatively identified levels, the concentrations of these analytes were flagged as estimated (J). Neither concentration was greater than 5 times the concentration observed in the blank. The analytes should be reported as non-detect at the reporting limit (U).

The estimated levels of 1,2,4-trichlorobenzene in DP-5 and n-butylbenzene in DP-1 and DP-2 should be flagged as non-detect at the reporting limit (U).

2.4.2 Trip Blanks

The Trip Blank contained Bromobenzene and styrene at estimated (tentatively identified) levels. Sample DUP1 also contained Bromobenzene at an estimated level that was less than 5 times the concentration observed in the blank. The analyte should be reported as non-detect at the reporting limit (U).

The estimated level of styrene in DUP1 should be flagged as non-detect at the reporting limit (U).

2.5 Laboratory Qualifications

Several of the analytes were detected at levels that were above the method detection limit (MDL) but below the reporting limit (RL). These results were flagged with the quantitation limit as estimated (J). Several analyte recoveries in the soil MS/MSD were biased high (see Section 2.3). The associated sample had low level detections of these analytes and the laboratory qualified the detection limits as estimated (UJ).

No further qualifications are necessary.

3.0 Field QA/QC

3.1 Replicate Samples

Sample DUP1 was a replicate sample of DP-5; sample DUP2 was a replicate of sample SB-4-43. The below tables present the results of the duplicate comparison.

Field Duplicate Pair	Parameter	Original Result ppb	Duplicate Result ppb	RPD	RPD Limits
DP-5	1,2,4-trichlorobenzene	0.57 J	< 1.0	NA	<30%
DUP1	acetone	< 50	12 J	NA	<30%
	cis-1,2 Dichloroethane	0.32 J	1	NA	<30%
	isopropylbenzene	< 2.0	0.17 J	NA	<30%
	2-butanone	< 20	1.9 J	NA	<30%
	m- & p-xylene	< 4.0	0.22 J	NA	<30%
	4-isopropyltoluene	3.2	0.55 J	NA	<30%
	styrene	< 2.0	0.12 J	NA	<30%
	trichloroethene	1.4	1.8	25%	<30%
	tetrachloroethene	150	170	12.5%	<30%
	toluene	< 2.0	0.35 J	NA	<30%

Eleven analytes were detected in either the parent sample DP-5 or the replicate sample DUP1, nine of the analytes were present at estimated levels below the RL in at least one of the samples. Only two of the analytes were detected at levels above the reporting limit in both the parent and replicate sample. These analytes include trichloroethene and tetrachloroethene. The RPD for both analytes is within the control limit of 30%. It should be noted that sample DP-5 was diluted by a factor of 2.

No qualifications are necessary.

Field Duplicate Pair	Parameter	Original Result ppb	Duplicate Result ppb	RPD	RPD Limits
SB-4-43	tetrachloroethene	3700	3300	11%	<30%
DUP2					

Only tetrachloroethene was detected in either the parent sample SB-4-43 or the replicate sample DUP2. The RPD for the analyte was within the established control limit of 30%.

No qualifications are necessary.

3.2 Rinsate Blanks

Both the rinsate blanks associated with the soil sampling (BLK1) and the rinsate blank associated with the water sampling (BLK2) contained hits for dichlorobromomethane, chloroform, and chlorodibromomethane. Sample BLK2 also contained a hit for acetone at a tentatively identified level.

The soil samples were non-detect for the target analytes that were detected in rinsate blank BLK1. Samples DP-2, DP-3, and DUP1 (the replicate of DP-5) contained detections for acetone at tentatively identified levels that were less than 5 times that observed in the blank. Acetone should be flagged non-detect (U) at the detection limit in these samples. DUP1 also contained a detection for chloroform at a tentatively identified level. Chloroform should be flagged non-detect (U) at the detection limit in DUP1.

Chloroform in sample DUP1 and acetone in samples DP-2, DP-3, and DUP1 should be flagged non-detect (U) at the detection limit.

4.0 Conclusions and Recommendations

These data are acceptable and can be considered as representative of the samples collected in the field. However, the data should be flagged as indicated above.

QA LEVEL II - DATA EVALUATION CHECKLIST

Company Name: USAID
 Project Name: Dalith Brownfield
 Reviewer: Kean Mabarak

Laboratory: Test America

Analytical Method (type and no.): B20B - 11 soil, 11 water

Matrix: Air Soil/Sed. Water Waste

Sample Names Soil = SB-1-18, SB-1-13, SB-2-15, SB-2-42, SB-3-10, SB-3-35

SB-4-19 (includes MS/MSD), SB-4-13, Pupa

Water = DP-1, DP-2, DP-3, DP-4, DP-5, MS/MSD (DP-3),

BIK1, BIK2, TRIP BLANK, DUP1

Project Manager: Tracy Epperly
 Project Number: 14
 Validation Date: 05/20/10

SDG #: 680-56230-1

NOTE: Please provide calculation in Comment areas or on the back (if on the back please indicate in comment areas).

Field Information

	YES	NO	NA	COMMENTS
a) Sampling dates noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Sampling team indicated?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Sample location noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Sample depth indicated (Soils)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Sample type indicated (grab/composite)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
f) Field QC noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Field parameters collected (note types)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	screen ports did not make enough water to take measurements
h) Field Calibration within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
i) Notations of unacceptable field conditions/performances from field logs or field notes?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
j) Does the laboratory narrative indicate deficiencies:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Note Deficiencies:

Chain-of-Custody (COC)

	YES	NO	NA	COMMENTS
k) Was the COC properly completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
l) Was the COC signed by both field and laboratory personnel?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
m) Were samples received in good condition?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The names were interchanged for the soil + water field duplicates. SB-2-72 labeled as SB-2-71.

General (Reference QAPP or Method)

	YES	NO	NA	COMMENTS
a) Were hold times met for sample pretreatment?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were hold times met for sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Were the correct preservatives used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
d) Was the correct method used?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
e) Were appropriate reporting limits achieved?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
f) Were any sample dilutions noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
g) Were any matrix problems noted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Acetone exceeded for soil+water
 DP-1=Sp, DP-2=Sx, DP-4=SD+, DP-5=dx
 MS/MSD for SB-9-19 outside control limits, LCS w/in limits
 See MS/MSD discussion

	YES	NO	NA	COMMENTS
Blanks				
a) Were analytes detected in the method blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	n-butylbenzene(?) check 161873
b) Were analytes detected in the field blank(s)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Were analytes detected in the equipment blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	BK2/BK1 = 1,1,2 dichlorobromoethane, chlorobromo Bromo benzene (J), Styrene (J)
d) Were analytes detected in the trip blank(s)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	chlorodibromo methane
Laboratory Control Sample (LCS)	YES	NO	NA	COMMENTS
a) Was a LCS analyzed once per SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
b) Were the proper compounds included in the LCS?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
c) Was the LCS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Duplicates	YES	NO	NA	COMMENTS
a) Were field duplicates collected (note original and duplicate sample names)?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Dup-1/PP-2 + Dup2/BB-4-13
b) Were field dup. precision criteria met (note RPD)?	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	sec acceptable attached for %RPD
c) Were lab duplicates analyzed (note original and duplicate samples)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
d) Were lab dup. precision criteria met (note RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Blind Standards	YES	NO	NA	COMMENTS
a) Was a blind standard used (indicate name, compounds included and concentrations)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
b) Was the %D within control limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	YES	NO	NA	COMMENTS
a) Was MS accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	no biased high for several analytes
b) Recovery could not be calculated since sample contained high concentration of analyte.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	for Soil MSD associated
c) Was MSD accuracy criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	sample results generalized by laboratory, no further necessary
Recovery could not be calculated since sample contained high concentration of analyte.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Naphthalene biased low in MSD
d) Were MS/MSD precision criteria met?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1,1,2 TCA, ethylenedibromochlorobromethane in RPD out for Naphthalene MSD/30% biased low / LCS w/in control limits
Reagent Water Spike and Duplicate (RWS & RWSD)	YES	NO	NA	COMMENTS
a) Was RWS accuracy criteria met?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
b) Was RWSD accuracy criteria met?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
c) Was RWS/RWSD precision criteria met (RPD)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Surrogate Spikes	YES	NO	NA	COMMENTS
a) Were surrogate recoveries within control limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4-Bromofluorobenzene
b) Were surrogate recoveries not calculated due to dilutions?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Biased high in SP-A-4-13 sample diluted to 20%. duplicate sample w/in limits + meets precision criteria. No qualification necessary

Comments/Notes:

See attached Summary for discussion
 See attached Table for field duplicate RPD

Data Qualification:

Sample Name	Constituent(s)	Result	Qualifier	Reason
<i>See attached Summary</i>				

Signature:

Date:

SP 20/10

APPENDIX C

LABORATORY ANALYTICAL REPORTS

ANALYTICAL REPORT

Job Number: 680-56230-1

Job Description: Former Duluth Dry Cleaners

For:

U.S. Army Corps of Engineers
PO BOX 889

Savannah, GA 31402-0889

Attention: Mr. Kevin Haborak



Approved for release.
Kathryn Smith
Project Manager I
4/16/2010 6:32 PM

Kathryn Smith
Project Manager I
kathye.smith@testamericainc.com
04/16/2010

The test results in this report meet NELAP requirements for parameters for which accreditation is required or available. Any exceptions to the NELAP requirements are noted. Results pertain only to samples listed in this report. This report may not be reproduced, except in full, without the written approval of the laboratory. Questions should be directed to the person who signed this report.

Savannah Certifications and ID #'s: A2LA: 0399.01; AL: 41450; ARDEQ: 88-0692; ARDOH; AZ: AZ0741; CA: 03217CA; CO; CT: PH0161; DE; FL: E87052; GA: 803; Guam; HI; IL: 200022; IN; IA: 353; KS: E-10322; KY EPPC: 90084; KY UST; LA DEQ: 30690; LA DHH: LA080008; ME: 2008022; MD: 250; MA: M-GA006; MI: 9925; MS: NFESC: 249; NV: GA00006; NJ: GA769; NM; NY: 10842; NC DWQ: 269; NC DHHS: 13701; PA: 68-00474; PR: GA00006; RI: LAO00244; SC: 98001001; TN: TN0296; TX: T104704185; USEPA: GA00006; VT: VT-87052; VA: 00302; WA; WV DEP: 094; WV DHHR: 9950 C; WI DNR: 999819810; WY/EPAR8: 8TMS-Q

**Job Narrative
680-56230-1**

Comments

No additional comments.

Receipt

All samples were received in good condition within temperature requirements.

GC/MS VOA

Method(s) 8260B: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for sample SB-4-19 (680-56230-11 MS) were outside control limits. The associated laboratory control sample (LCS) recovery met acceptance criteria.

Method(s) 8260B: Surrogate recovery for the following sample(s) was outside control limits: SB-4-43 (680-56230-12). Re-extraction and/or re-analysis was performed with concurring results. The original analysis has been reported.

Method(s) 8260B: The field blanks associated with these samples contained detections above the reporting limit (RL), for Chlorodibromomethane, Chloroform, and Dichlorobromomethane. 680-56230-17 also contained Acetone above the method detection limit (MDL) . The presence of these compounds was confirmed by re-analysis.

Method(s) 8260B: The trip blank associated with these samples contained a detection above the method detection limit (MDL) for the following analyte: bromobenzene and styrene.

No other analytical or quality issues were noted.

General Chemistry

No analytical or quality issues were noted.

VOA Prep

No analytical or quality issues were noted.

METHOD / ANALYST SUMMARY

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method	Analyst	Analyst ID
SW846 8260B	Bearden, Robert	RB
SW846 8260B	Cowart, Judson	WJC
SW846 8260B	Sokolin, Eleina	ES
EPA Moisture	Morgan, Harriet	HM

SAMPLE SUMMARY

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
680-56230-1	SB-1-18	Solid	03/25/2010 1305	03/27/2010 1040
680-56230-2	SB-1-43	Solid	03/25/2010 1505	03/27/2010 1040
680-56230-3	BLK1	Water	03/25/2010 1515	03/27/2010 1040
680-56230-4	DP-5	Water	03/26/2010 0945	03/27/2010 1040
680-56230-5	SB-2-15	Solid	03/26/2010 1040	03/27/2010 1040
680-56230-6	DUP2	Solid	03/26/2010 1100	03/27/2010 1040
680-56230-7	SB-2-42	Solid	03/26/2010 1105	03/27/2010 1040
680-56230-8	DP-2	Water	03/26/2010 1255	03/27/2010 1040
680-56230-9	DP-1	Water	03/26/2010 1240	03/27/2010 1040
680-56230-10	DUP1	Water	03/26/2010 1300	03/27/2010 1040
680-56230-11	SB-4-19	Solid	03/26/2010 1340	03/27/2010 1040
680-56230-11MS	SB-4-19	Solid	03/26/2010 1340	03/27/2010 1040
680-56230-11MSD	SB-4-19	Solid	03/26/2010 1340	03/27/2010 1040
680-56230-12	SB-4-43	Solid	03/26/2010 1420	03/27/2010 1040
680-56230-13	DP-4	Water	03/26/2010 1440	03/27/2010 1040
680-56230-14	SB-3-10	Solid	03/26/2010 1520	03/27/2010 1040
680-56230-15	SB-3-35	Solid	03/26/2010 1545	03/27/2010 1040
680-56230-16	DP-3	Water	03/26/2010 1615	03/27/2010 1040
680-56230-16MS	DP-3	Water	03/26/2010 1615	03/27/2010 1040
680-56230-16MSD	DP-3	Water	03/26/2010 1615	03/27/2010 1040
680-56230-17	BLK2	Water	03/26/2010 1630	03/27/2010 1040
680-56230-18	TRIP BLANK	Water	03/26/2010 0000	03/27/2010 1040

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-1-18

Lab Sample ID: 680-56230-1

Date Sampled: 03/25/2010 1305

Client Matrix: Solid

% Moisture: 18.0

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0189.d
Dilution:	1.0		Initial Weight/Volume:	9.8 g
Date Analyzed:	04/05/2010 1226		Final Weight/Volume:	1.0 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane		2.9	U	2.9	6.1
1,1,1-Trichloroethane		0.72	U	0.72	6.1
1,1,2,2-Tetrachloroethane		2.0	U	2.0	6.1
1,1,2-Trichloroethane		1.6	U	1.6	6.1
1,1-Dichloroethane		1.3	U	1.3	6.1
1,1-Dichloroethene		1.8	U	1.8	6.1
1,1-Dichloropropene		1.2	U	1.2	6.1
1,2,3-Trichlorobenzene		2.0	U	2.0	6.1
1,2,3-Trichloropropane		2.9	U	2.9	6.1
1,2,4-Trichlorobenzene		1.1	U	1.1	6.1
1,2,4-Trimethylbenzene		1.7	U	1.7	6.1
1,2-Dichloroethane		1.3	U	1.3	6.1
1,2-Dichlorobenzene		1.6	U	1.6	6.1
1,2-Dibromo-3-Chloropropane		5.4	U	5.4	12
1,2-Dichloropropane		1.0	U	1.0	6.1
Ethylene Dibromide		1.8	U	1.8	6.1
1,3,5-Trimethylbenzene		2.1	U	2.1	6.1
1,3-Dichlorobenzene		2.0	U	2.0	6.1
1,3-Dichloropropane		2.2	U	2.2	6.1
1,4-Dichlorobenzene		0.90	U	0.90	6.1
1-Chlorohexane		2.6	U	2.6	6.1
2,2-Dichloropropane		1.3	U	1.3	6.1
2-Chlorotoluene		2.4	U	2.4	6.1
4-Chlorotoluene		2.1	U	2.1	6.1
Acetone	30	J		13	61
Benzene	0.89	U		0.89	6.1
Bromobenzene	2.1	U		2.1	6.1
Chlorobromomethane	4.0	U		4.0	6.1
Dichlorobromomethane	1.2	U		1.2	6.1
Bromoform	1.8	U		1.8	6.1
Bromomethane	1.8	U		1.8	6.1
Carbon tetrachloride	1.0	U		1.0	6.1
Chlorobenzene	1.2	U Q		1.2	6.1
Chloroethane	3.3	U		3.3	6.1
Chloroform	1.3	U Q		1.3	6.1
Chloromethane	1.2	U		1.2	6.1
cis-1,2-Dichloroethene	1.7	U		1.7	6.1
cis-1,3-Dichloropropene	1.0	U		1.0	6.1
Chlorodibromomethane	2.1	U		2.1	6.1
Dichlorodifluoromethane	1.1	U		1.1	6.1
Ethylbenzene	1.6	U		1.6	6.1
Hexachlorobutadiene	3.8	U		3.8	6.1
Isopropylbenzene	2.3	U		2.3	6.1
Methylene Chloride	1.2	U		1.2	6.1
Methyl tert-butyl ether	1.2	U		1.2	61
2-Butanone (MEK)	4.5	J		2.9	30

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: **SB-1-18**

Lab Sample ID: 680-56230-1

Date Sampled: 03/25/2010 1305

Client Matrix: Solid

% Moisture: 18.0

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0189.d
Dilution:	1.0		Initial Weight/Volume:	9.8 g
Date Analyzed:	04/05/2010 1226		Final Weight/Volume:	1.0 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)		5.1	U	5.1	30
n-Butylbenzene		2.9	U	2.9	6.1
N-Propylbenzene		3.3	U	3.3	6.1
m-Xylene & p-Xylene		3.2	U	3.2	12
Naphthalene		1.5	U	1.5	6.1
o-Xylene		1.3	U Q	1.3	6.1
4-Isopropyltoluene		2.7	U	2.7	6.1
sec-Butylbenzene		2.6	U	2.6	6.1
Styrene		1.1	U	1.1	6.1
Trichloroethene		1.6	U	1.6	6.1
tert-Butylbenzene		2.2	U	2.2	6.1
Tetrachloroethene		13		2.3	6.1
Toluene		1.0	U	1.0	6.1
trans-1,2-Dichloroethene		0.77	U	0.77	6.1
trans-1,3-Dichloropropene		1.1	U	1.1	6.1
Trichlorofluoromethane		1.5	U	1.5	6.1
Vinyl chloride		1.8	U	1.8	6.1
Surrogate		%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene		107		65 - 124	
Dibromofluoromethane		77		65 - 124	
Toluene-d8 (Surr)		95		65 - 132	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-1-43

Lab Sample ID: 680-56230-2

Date Sampled: 03/25/2010 1505

Client Matrix: Solid

% Moisture: 20.1

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0190.d
Dilution:	1.0		Initial Weight/Volume:	11.2 g
Date Analyzed:	04/05/2010 1249		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane		1.3	U	1.3	2.8
1,1,1-Trichloroethane		0.33	U	0.33	2.8
1,1,2,2-Tetrachloroethane		0.89	U	0.89	2.8
1,1,2-Trichloroethane		0.73	U	0.73	2.8
1,1-Dichloroethane		0.61	U	0.61	2.8
1,1-Dichloroethene		0.84	U	0.84	2.8
1,1-Dichloropropene		0.53	U	0.53	2.8
1,2,3-Trichlorobenzene		0.89	U	0.89	2.8
1,2,3-Trichloropropane		1.3	U	1.3	2.8
1,2,4-Trichlorobenzene		0.50	U	0.50	2.8
1,2,4-Trimethylbenzene		0.78	U	0.78	2.8
1,2-Dichloroethane		0.61	U	0.61	2.8
1,2-Dichlorobenzene		0.73	U	0.73	2.8
1,2-Dibromo-3-Chloropropane		2.5	U	2.5	5.6
1,2-Dichloropropane		0.48	U	0.48	2.8
Ethylene Dibromide		0.84	U	0.84	2.8
1,3,5-Trimethylbenzene		0.95	U	0.95	2.8
1,3-Dichlorobenzene		0.89	U	0.89	2.8
1,3-Dichloropropane		1.0	U	1.0	2.8
1,4-Dichlorobenzene		0.41	U	0.41	2.8
1-Chlorohexane		1.2	U	1.2	2.8
2,2-Dichloropropane		0.61	U	0.61	2.8
2-Chlorotoluene		1.1	U	1.1	2.8
4-Chlorotoluene		0.95	U	0.95	2.8
Acetone		13	J	6.1	28
Benzene		0.41	U	0.41	2.8
Bromobenzene		0.95	U	0.95	2.8
Chlorobromomethane		1.8	U	1.8	2.8
Dichlorobromomethane		0.54	U	0.54	2.8
Bromoform		0.84	U	0.84	2.8
Bromomethane		0.84	U	0.84	2.8
Carbon tetrachloride		0.46	U	0.46	2.8
Chlorobenzene		0.54	U Q	0.54	2.8
Chloroethane		1.5	U	1.5	2.8
Chloroform		0.61	U Q	0.61	2.8
Chloromethane		0.56	U	0.56	2.8
cis-1,2-Dichloroethene		0.78	U	0.78	2.8
cis-1,3-Dichloropropene		0.46	U	0.46	2.8
Chlorodibromomethane		0.95	U	0.95	2.8
Dichlorodifluoromethane		0.53	U	0.53	2.8
Ethylbenzene		0.73	U	0.73	2.8
Hexachlorobutadiene		1.7	U	1.7	2.8
Isopropylbenzene		1.1	U	1.1	2.8
Methylene Chloride		0.55	U	0.55	2.8
Methyl tert-butyl ether		0.56	U	0.56	28
2-Butanone (MEK)		1.3	U	1.3	14

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: **SB-1-43**

Lab Sample ID: 680-56230-2

Date Sampled: 03/25/2010 1505

Client Matrix: Solid

% Moisture: 20.1

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0190.d
Dilution:	1.0		Initial Weight/Volume:	11.2 g
Date Analyzed:	04/05/2010 1249		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)		2.3	U	2.3	14
n-Butylbenzene		1.3	U	1.3	2.8
N-Propylbenzene		1.5	U	1.5	2.8
m-Xylene & p-Xylene		1.5	U	1.5	5.6
Naphthalene		0.67	U	0.67	2.8
o-Xylene		0.61	U Q	0.61	2.8
4-Isopropyltoluene		1.2	U	1.2	2.8
sec-Butylbenzene		1.2	U	1.2	2.8
Styrene		0.52	U	0.52	2.8
Trichloroethene		0.73	U	0.73	2.8
tert-Butylbenzene		1.0	U	1.0	2.8
Tetrachloroethene		35		1.1	2.8
Toluene		0.47	U	0.47	2.8
trans-1,2-Dichloroethene		0.35	U	0.35	2.8
trans-1,3-Dichloropropene		0.49	U	0.49	2.8
Trichlorofluoromethane		0.67	U	0.67	2.8
Vinyl chloride		0.84	U	0.84	2.8
Surrogate		%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene		108		65 - 124	
Dibromofluoromethane		79		65 - 124	
Toluene-d8 (Surr)		92		65 - 132	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: BLK1

Lab Sample ID: 680-56230-3

Date Sampled: 03/25/2010 1515

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0435.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1308		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1308			

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.25	U	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	5.0	U	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.16	U	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	2.3		0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	2.3		0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	1.5		0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.11	U	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.10	U	0.10	1.0
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.0	U	1.0	10

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: **BLK1**

Lab Sample ID: 680-56230-3

Date Sampled: 03/25/2010 1515

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0435.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1308		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1308			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.10	U	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.20	U	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.13	U	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.11	U	0.11	1.0
Trichloroethene	0.13	U	0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	0.15	U	0.15	1.0
Toluene	0.33	U	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	102		75 - 120	
Dibromofluoromethane	116		75 - 121	
Toluene-d8 (Surr)	104		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-5Lab Sample ID: 680-56230-4
Client Matrix: WaterDate Sampled: 03/26/2010 0945
Date Received: 03/27/2010 1040**8260B Volatile Organic Compounds (GC/MS)**

Method:	8260B	Analysis Batch: 680-165125	Instrument ID:	MSA2
Preparation:	5030B		Lab File ID:	a036.d
Dilution:	2.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 1759		Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 1759			

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	0.66	U	0.66	2.0
1,1,1-Trichloroethane	1.0	U	1.0	2.0
1,1,2,2-Tetrachloroethane	0.36	U	0.36	2.0
1,1,2-Trichloroethane	0.26	U	0.26	2.0
1,1-Dichloroethane	0.50	U	0.50	2.0
1,1-Dichloroethene	0.22	U	0.22	2.0
1,1-Dichloropropene	0.50	U	0.50	2.0
1,2,3-Trichlorobenzene	0.70	U	0.70	2.0
1,2,3-Trichloropropane	0.82	U	0.82	2.0
1,2,4-Trichlorobenzene	0.57	J	0.50	2.0
1,2,4-Trimethylbenzene	0.66	U	0.66	2.0
1,2-Dichloroethane	0.20	U	0.20	2.0
1,2-Dichlorobenzene	0.42	U	0.42	2.0
1,2-Dibromo-3-Chloropropane	0.88	U	0.88	2.0
1,2-Dichloropropane	0.26	U	0.26	2.0
Ethylene Dibromide	0.50	U	0.50	2.0
1,3,5-Trimethylbenzene	0.66	U	0.66	2.0
1,3-Dichlorobenzene	0.50	U	0.50	2.0
1,3-Dichloropropane	0.26	U	0.26	2.0
1,4-Dichlorobenzene	0.56	U	0.56	2.0
1-Chlorohexane	0.54	U	0.54	2.0
2,2-Dichloropropane	0.24	U	0.24	2.0
2-Chlorotoluene	0.34	U	0.34	2.0
4-Chlorotoluene	0.54	U	0.54	2.0
Acetone	10	U	10	50
Benzene	0.50	U	0.50	2.0
Bromobenzene	0.32	U	0.32	2.0
Chlorobromomethane	0.28	U	0.28	2.0
Dichlorobromomethane	0.50	U	0.50	2.0
Bromoform	1.0	U	1.0	2.0
Bromomethane	1.6	U	1.6	2.0
Carbon tetrachloride	1.0	U	1.0	2.0
Chlorobenzene	0.50	U	0.50	2.0
Chloroethane	2.0	U	2.0	2.0
Chloroform	0.28	U	0.28	2.0
Chloromethane	0.66	U	0.66	2.0
cis-1,2-Dichloroethene	1.2	J	0.30	2.0
cis-1,3-Dichloropropene	0.22	U	0.22	2.0
Chlorodibromomethane	0.20	U	0.20	2.0
Dichlorodifluoromethane	0.50	U	0.50	2.0
Ethylbenzene	0.22	U	0.22	2.0
Hexachlorobutadiene	0.80	U	0.80	2.0
Isopropylbenzene	0.20	U	0.20	2.0
Methylene Chloride	2.0	U	2.0	10
Methyl tert-butyl ether	0.40	U	0.40	20
2-Butanone (MEK)	2.0	U	2.0	20

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-5

Lab Sample ID: 680-56230-4

Date Sampled: 03/26/2010 0945

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-165125	Instrument ID:	MSA2
Preparation:	5030B		Lab File ID:	a036.d
Dilution:	2.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 1759		Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 1759			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	2.0	U	2.0	20
n-Butylbenzene	0.20	U	0.20	2.0
N-Propylbenzene	0.30	U	0.30	2.0
m-Xylene & p-Xylene	0.40	U	0.40	4.0
Naphthalene	2.0	U	2.0	10
o-Xylene	0.50	U	0.50	2.0
4-Isopropyltoluene	3.2		0.26	2.0
sec-Butylbenzene	0.32	U	0.32	2.0
Styrene	0.22	U	0.22	2.0
Trichloroethene	1.4	J	0.26	2.0
tert-Butylbenzene	0.24	U	0.24	2.0
Tetrachloroethene	150		0.30	2.0
Toluene	0.66	U	0.66	2.0
trans-1,2-Dichloroethene	0.40	U	0.40	2.0
trans-1,3-Dichloropropene	0.42	U	0.42	2.0
Trichlorofluoromethane	0.50	U	0.50	2.0
Vinyl chloride	0.36	U	0.36	2.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	95		75 - 120	
Dibromofluoromethane	97		75 - 121	
Toluene-d8 (Surr)	96		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-2-15

Lab Sample ID: 680-56230-5

Date Sampled: 03/26/2010 1040

Client Matrix: Solid

% Moisture: 11.9

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0191.d
Dilution:	1.0		Initial Weight/Volume:	9.7 g
Date Analyzed:	04/05/2010 1311		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane		1.4	U	1.4	2.9
1,1,1-Trichloroethane		0.35	U	0.35	2.9
1,1,2,2-Tetrachloroethane		0.94	U	0.94	2.9
1,1,2-Trichloroethane		0.76	U	0.76	2.9
1,1-Dichloroethane		0.64	U	0.64	2.9
1,1-Dichloroethene		0.88	U	0.88	2.9
1,1-Dichloropropene		0.56	U	0.56	2.9
1,2,3-Trichlorobenzene		0.94	U	0.94	2.9
1,2,3-Trichloropropane		1.4	U	1.4	2.9
1,2,4-Trichlorobenzene		0.52	U	0.52	2.9
1,2,4-Trimethylbenzene		0.82	U	0.82	2.9
1,2-Dichloroethane		0.64	U	0.64	2.9
1,2-Dichlorobenzene		0.76	U	0.76	2.9
1,2-Dibromo-3-Chloropropane		2.6	U	2.6	5.8
1,2-Dichloropropane		0.50	U	0.50	2.9
Ethylene Dibromide		0.88	U	0.88	2.9
1,3,5-Trimethylbenzene		0.99	U	0.99	2.9
1,3-Dichlorobenzene		0.94	U	0.94	2.9
1,3-Dichloropropane		1.1	U	1.1	2.9
1,4-Dichlorobenzene		0.43	U	0.43	2.9
1-Chlorohexane		1.2	U	1.2	2.9
2,2-Dichloropropane		0.64	U	0.64	2.9
2-Chlorotoluene		1.2	U	1.2	2.9
4-Chlorotoluene		0.99	U	0.99	2.9
Acetone		7.7	J	6.4	29
Benzene		0.43	U	0.43	2.9
Bromobenzene		0.99	U	0.99	2.9
Chlorobromomethane		1.9	U	1.9	2.9
Dichlorobromomethane		0.57	U	0.57	2.9
Bromoform		0.88	U	0.88	2.9
Bromomethane		0.88	U	0.88	2.9
Carbon tetrachloride		0.49	U	0.49	2.9
Chlorobenzene		0.56	U Q	0.56	2.9
Chloroethane		1.6	U	1.6	2.9
Chloroform		0.64	U Q	0.64	2.9
Chloromethane		0.58	U	0.58	2.9
cis-1,2-Dichloroethene		4.0		0.82	2.9
cis-1,3-Dichloropropene		0.49	U	0.49	2.9
Chlorodibromomethane		0.99	U	0.99	2.9
Dichlorodifluoromethane		0.55	U	0.55	2.9
Ethylbenzene		0.76	U	0.76	2.9
Hexachlorobutadiene		1.8	U	1.8	2.9
Isopropylbenzene		1.1	U	1.1	2.9
Methylene Chloride		0.57	U	0.57	2.9
Methyl tert-butyl ether		0.58	U	0.58	29
2-Butanone (MEK)		1.4	U	1.4	15

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-2-15

Lab Sample ID: 680-56230-5

Date Sampled: 03/26/2010 1040

Client Matrix: Solid

% Moisture: 11.9

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0191.d
Dilution:	1.0		Initial Weight/Volume:	9.7 g
Date Analyzed:	04/05/2010 1311		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)		2.5	U	2.5	15
n-Butylbenzene		1.4	U	1.4	2.9
N-Propylbenzene		1.6	U	1.6	2.9
m-Xylene & p-Xylene		1.5	U	1.5	5.8
Naphthalene		0.70	U	0.70	2.9
o-Xylene		0.64	U Q	0.64	2.9
4-Isopropyltoluene		1.3	U	1.3	2.9
sec-Butylbenzene		1.2	U	1.2	2.9
Styrene		0.54	U	0.54	2.9
Trichloroethene		0.76	U	0.76	2.9
tert-Butylbenzene		1.1	U	1.1	2.9
Tetrachloroethene		70		1.1	2.9
Toluene		0.49	U	0.49	2.9
trans-1,2-Dichloroethene		0.37	U	0.37	2.9
trans-1,3-Dichloropropene		0.51	U	0.51	2.9
Trichlorofluoromethane		0.70	U	0.70	2.9
Vinyl chloride		0.88	U	0.88	2.9
Surrogate		%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene		110		65 - 124	
Dibromofluoromethane		84		65 - 124	
Toluene-d8 (Surr)		95		65 - 132	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DUP2

Lab Sample ID: 680-56230-6

Date Sampled: 03/26/2010 1100

Client Matrix: Solid

% Moisture: 22.1

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164919	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0197.d
Dilution:	40		Initial Weight/Volume:	9.0 g
Date Analyzed:	04/05/2010 1528		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane		68	U	68	140
1,1,1-Trichloroethane		17	U	17	140
1,1,2,2-Tetrachloroethane		46	U	46	140
1,1,2-Trichloroethane		37	U	37	140
1,1-Dichloroethane		31	U	31	140
1,1-Dichloroethene		43	U	43	140
1,1-Dichloropropene		27	U	27	140
1,2,3-Trichlorobenzene		46	U	46	140
1,2,3-Trichloropropane		68	U	68	140
1,2,4-Trichlorobenzene		25	U	25	140
1,2,4-Trimethylbenzene		40	U	40	140
1,2-Dichloroethane		31	U	31	140
1,2-Dichlorobenzene		37	U	37	140
1,2-Dibromo-3-Chloropropane		130	U	130	290
1,2-Dichloropropane		25	U	25	140
Ethylene Dibromide		43	U	43	140
1,3,5-Trimethylbenzene		48	U	48	140
1,3-Dichlorobenzene		46	U	46	140
1,3-Dichloropropane		51	U	51	140
1,4-Dichlorobenzene		21	U	21	140
1-Chlorohexane		60	U	60	140
2,2-Dichloropropane		31	U	31	140
2-Chlorotoluene		57	U	57	140
4-Chlorotoluene		48	U	48	140
Acetone		310	U	310	1400
Benzene		21	U	21	140
Bromobenzene		48	U	48	140
Chlorobromomethane		94	U	94	140
Dichlorobromomethane		28	U	28	140
Bromoform		43	U	43	140
Bromomethane		43	U	43	140
Carbon tetrachloride		24	U	24	140
Chlorobenzene		27	U	27	140
Chloroethane		77	U	77	140
Chloroform		31	U	31	140
Chloromethane		29	U	29	140
cis-1,2-Dichloroethene		40	U	40	140
cis-1,3-Dichloropropene		24	U	24	140
Chlorodibromomethane		48	U	48	140
Dichlorodifluoromethane		27	U	27	140
Ethylbenzene		37	U	37	140
Hexachlorobutadiene		88	U	88	140
Isopropylbenzene		54	U	54	140
Methylene Chloride		28	U	28	140
Methyl tert-butyl ether		29	U	29	1400
2-Butanone (MEK)		68	U	68	710

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DUP2

Lab Sample ID: 680-56230-6

Date Sampled: 03/26/2010 1100

Client Matrix: Solid

% Moisture: 22.1

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164919	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0197.d
Dilution:	40		Initial Weight/Volume:	9.0 g
Date Analyzed:	04/05/2010 1528		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)		120	U	120	710
n-Butylbenzene		68	U	68	140
N-Propylbenzene		77	U	77	140
m-Xylene & p-Xylene		74	U	74	290
Naphthalene		34	U	34	140
o-Xylene		31	U	31	140
4-Isopropyltoluene		63	U	63	140
sec-Butylbenzene		60	U	60	140
Styrene		27	U	27	140
Trichloroethene		37	U	37	140
tert-Butylbenzene		51	U	51	140
Tetrachloroethene		3300		54	140
Toluene		24	U	24	140
trans-1,2-Dichloroethene		18	U	18	140
trans-1,3-Dichloropropene		25	U	25	140
Trichlorofluoromethane		34	U	34	140
Vinyl chloride		43	U	43	140
Surrogate		%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene		99		65 - 124	
Dibromofluoromethane		78		65 - 124	
Toluene-d8 (Surr)		86		65 - 132	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-2-42

Lab Sample ID: 680-56230-7

Date Sampled: 03/26/2010 1105

Client Matrix: Solid

% Moisture: 18.8

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0192.d
Dilution:	1.0		Initial Weight/Volume:	9.8 g
Date Analyzed:	04/05/2010 1334		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane		1.5	U	1.5	3.1
1,1,1-Trichloroethane		0.37	U	0.37	3.1
1,1,2,2-Tetrachloroethane		1.0	U	1.0	3.1
1,1,2-Trichloroethane		0.82	U	0.82	3.1
1,1-Dichloroethane		0.69	U	0.69	3.1
1,1-Dichloroethene		0.94	U	0.94	3.1
1,1-Dichloropropene		0.60	U	0.60	3.1
1,2,3-Trichlorobenzene		1.0	U	1.0	3.1
1,2,3-Trichloropropane		1.5	U	1.5	3.1
1,2,4-Trichlorobenzene		0.56	U	0.56	3.1
1,2,4-Trimethylbenzene		0.88	U	0.88	3.1
1,2-Dichloroethane		0.69	U	0.69	3.1
1,2-Dichlorobenzene		0.82	U	0.82	3.1
1,2-Dibromo-3-Chloropropane		2.8	U	2.8	6.3
1,2-Dichloropropane		0.54	U	0.54	3.1
Ethylene Dibromide		0.94	U	0.94	3.1
1,3,5-Trimethylbenzene		1.1	U	1.1	3.1
1,3-Dichlorobenzene		1.0	U	1.0	3.1
1,3-Dichloropropane		1.1	U	1.1	3.1
1,4-Dichlorobenzene		0.46	U	0.46	3.1
1-Chlorohexane		1.3	U	1.3	3.1
2,2-Dichloropropane		0.69	U	0.69	3.1
2-Chlorotoluene		1.3	U	1.3	3.1
4-Chlorotoluene		1.1	U	1.1	3.1
Acetone		8.1	J	6.9	31
Benzene		0.46	U	0.46	3.1
Bromobenzene		1.1	U	1.1	3.1
Chlorobromomethane		2.1	U	2.1	3.1
Dichlorobromomethane		0.61	U	0.61	3.1
Bromoform		0.94	U	0.94	3.1
Bromomethane		0.94	U	0.94	3.1
Carbon tetrachloride		0.52	U	0.52	3.1
Chlorobenzene		0.60	U Q	0.60	3.1
Chloroethane		1.7	U	1.7	3.1
Chloroform		0.69	U Q	0.69	3.1
Chloromethane		0.63	U	0.63	3.1
cis-1,2-Dichloroethene		0.88	U	0.88	3.1
cis-1,3-Dichloropropene		0.52	U	0.52	3.1
Chlorodibromomethane		1.1	U	1.1	3.1
Dichlorodifluoromethane		0.59	U	0.59	3.1
Ethylbenzene		0.82	U	0.82	3.1
Hexachlorobutadiene		1.9	U	1.9	3.1
Isopropylbenzene		1.2	U	1.2	3.1
Methylene Chloride		0.62	U	0.62	3.1
Methyl tert-butyl ether		0.63	U	0.63	31
2-Butanone (MEK)		1.5	U	1.5	16

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-2-42

Lab Sample ID: 680-56230-7

Date Sampled: 03/26/2010 1105

Client Matrix: Solid

% Moisture: 18.8

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0192.d
Dilution:	1.0		Initial Weight/Volume:	9.8 g
Date Analyzed:	04/05/2010 1334		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)		2.6	U	2.6	16
n-Butylbenzene		1.5	U	1.5	3.1
N-Propylbenzene		1.7	U	1.7	3.1
m-Xylene & p-Xylene		1.6	U	1.6	6.3
Naphthalene		0.75	U	0.75	3.1
o-Xylene		0.69	U Q	0.69	3.1
4-Isopropyltoluene		1.4	U	1.4	3.1
sec-Butylbenzene		1.3	U	1.3	3.1
Styrene		0.58	U	0.58	3.1
Trichloroethene		0.82	U	0.82	3.1
tert-Butylbenzene		1.1	U	1.1	3.1
Tetrachloroethene		12		1.2	3.1
Toluene		0.53	U	0.53	3.1
trans-1,2-Dichloroethene		0.40	U	0.40	3.1
trans-1,3-Dichloropropene		0.55	U	0.55	3.1
Trichlorofluoromethane		0.75	U	0.75	3.1
Vinyl chloride		0.94	U	0.94	3.1
Surrogate		%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene		105		65 - 124	
Dibromofluoromethane		83		65 - 124	
Toluene-d8 (Surr)		92		65 - 132	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-2Lab Sample ID: 680-56230-8
Client Matrix: WaterDate Sampled: 03/26/2010 1255
Date Received: 03/27/2010 1040**8260B Volatile Organic Compounds (GC/MS)**

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0447.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1605		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1605			

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.25	U	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	7.0	J	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.16	U	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	0.25	U	0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	0.14	U	0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	0.32	J	0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	0.10	U	0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.13	J	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.10	U	0.10	1.0
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.0	U	1.0	10

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-2

Lab Sample ID: 680-56230-8

Date Sampled: 03/26/2010 1255

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0447.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1605		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1605			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.13	J	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.20	U	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.14	J	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.11	U	0.11	1.0
Trichloroethene	1.0		0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	350	J	0.15	1.0
Toluene	0.33	U	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	104		75 - 120	
Dibromofluoromethane	115		75 - 121	
Toluene-d8 (Surr)	101		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-2Lab Sample ID: 680-56230-8
Client Matrix: WaterDate Sampled: 03/26/2010 1255
Date Received: 03/27/2010 1040**8260B Volatile Organic Compounds (GC/MS)**

Method:	8260B	Analysis Batch: 680-165000	Instrument ID:	MSA2
Preparation:	5030B		Lab File ID:	a030.d
Dilution:	5.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 0155	Run Type: DL	Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 0155			

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	1.6	U	1.6	5.0
1,1,1-Trichloroethane	2.5	U	2.5	5.0
1,1,2,2-Tetrachloroethane	0.90	U	0.90	5.0
1,1,2-Trichloroethane	0.65	U	0.65	5.0
1,1-Dichloroethane	1.2	U	1.2	5.0
1,1-Dichloroethene	0.55	U	0.55	5.0
1,1-Dichloropropene	1.2	U	1.2	5.0
1,2,3-Trichlorobenzene	1.8	U	1.8	5.0
1,2,3-Trichloropropane	2.0	U	2.0	5.0
1,2,4-Trichlorobenzene	1.2	U	1.2	5.0
1,2,4-Trimethylbenzene	1.6	U	1.6	5.0
1,2-Dichloroethane	0.50	U	0.50	5.0
1,2-Dichlorobenzene	1.0	U	1.0	5.0
1,2-Dibromo-3-Chloropropane	2.2	U	2.2	5.0
1,2-Dichloropropane	0.65	U	0.65	5.0
Ethylene Dibromide	1.2	U	1.2	5.0
1,3,5-Trimethylbenzene	1.6	U	1.6	5.0
1,3-Dichlorobenzene	1.2	U	1.2	5.0
1,3-Dichloropropane	0.65	U	0.65	5.0
1,4-Dichlorobenzene	1.4	U	1.4	5.0
1-Chlorohexane	1.4	U	1.4	5.0
2,2-Dichloropropane	0.60	U	0.60	5.0
2-Chlorotoluene	0.85	U	0.85	5.0
4-Chlorotoluene	1.4	U	1.4	5.0
Acetone	25	U	25	120
Benzene	1.2	U	1.2	5.0
Bromobenzene	0.80	U	0.80	5.0
Chlorobromomethane	0.70	U	0.70	5.0
Dichlorobromomethane	1.2	U	1.2	5.0
Bromoform	2.5	U	2.5	5.0
Bromomethane	4.0	U	4.0	5.0
Carbon tetrachloride	2.5	U	2.5	5.0
Chlorobenzene	1.2	U	1.2	5.0
Chloroethane	5.0	U	5.0	5.0
Chloroform	0.70	U	0.70	5.0
Chloromethane	1.6	U	1.6	5.0
cis-1,2-Dichloroethene	0.75	U	0.75	5.0
cis-1,3-Dichloropropene	0.55	U	0.55	5.0
Chlorodibromomethane	0.50	U	0.50	5.0
Dichlorodifluoromethane	1.2	U	1.2	5.0
Ethylbenzene	0.55	U	0.55	5.0
Hexachlorobutadiene	2.0	U	2.0	5.0
Isopropylbenzene	0.50	U	0.50	5.0
Methylene Chloride	5.0	U	5.0	25
Methyl tert-butyl ether	1.0	U	1.0	50
2-Butanone (MEK)	5.0	U	5.0	50

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-2

Lab Sample ID: 680-56230-8

Date Sampled: 03/26/2010 1255

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-165000	Instrument ID:	MSA2
Preparation:	5030B		Lab File ID:	a030.d
Dilution:	5.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 0155	Run Type: DL	Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 0155			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	5.0	U	5.0	50
n-Butylbenzene	0.50	U	0.50	5.0
N-Propylbenzene	0.75	U	0.75	5.0
m-Xylene & p-Xylene	1.0	U	1.0	10
Naphthalene	5.0	U	5.0	25
o-Xylene	1.2	U	1.2	5.0
4-Isopropyltoluene	0.65	U	0.65	5.0
sec-Butylbenzene	0.80	U	0.80	5.0
Styrene	0.55	U	0.55	5.0
Trichloroethene	1.2	J	0.65	5.0
tert-Butylbenzene	0.60	U	0.60	5.0
Tetrachloroethene	360		0.75	5.0
Toluene	1.6	U	1.6	5.0
trans-1,2-Dichloroethene	1.0	U	1.0	5.0
trans-1,3-Dichloropropene	1.0	U	1.0	5.0
Trichlorofluoromethane	1.2	U	1.2	5.0
Vinyl chloride	0.90	U	0.90	5.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	94		75 - 120	
Dibromofluoromethane	93		75 - 121	
Toluene-d8 (Surr)	95		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-1Lab Sample ID: 680-56230-9
Client Matrix: WaterDate Sampled: 03/26/2010 1240
Date Received: 03/27/2010 1040**8260B Volatile Organic Compounds (GC/MS)**

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0449.d
Dilution:	5.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1634		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1634			

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	1.6	U	1.6	5.0
1,1,1-Trichloroethane	2.5	U	2.5	5.0
1,1,2,2-Tetrachloroethane	0.90	U	0.90	5.0
1,1,2-Trichloroethane	0.65	U	0.65	5.0
1,1-Dichloroethane	1.2	U	1.2	5.0
1,1-Dichloroethene	0.55	U	0.55	5.0
1,1-Dichloropropene	1.2	U	1.2	5.0
1,2,3-Trichlorobenzene	1.8	U	1.8	5.0
1,2,3-Trichloropropane	2.0	U	2.0	5.0
1,2,4-Trichlorobenzene	1.2	U	1.2	5.0
1,2,4-Trimethylbenzene	1.6	U	1.6	5.0
1,2-Dichloroethane	0.50	U	0.50	5.0
1,2-Dichlorobenzene	1.0	U	1.0	5.0
1,2-Dibromo-3-Chloropropane	2.2	U	2.2	5.0
1,2-Dichloropropane	0.65	U	0.65	5.0
Ethylene Dibromide	1.2	U	1.2	5.0
1,3,5-Trimethylbenzene	1.6	U	1.6	5.0
1,3-Dichlorobenzene	1.2	U	1.2	5.0
1,3-Dichloropropane	0.65	U	0.65	5.0
1,4-Dichlorobenzene	1.4	U	1.4	5.0
1-Chlorohexane	1.4	U	1.4	5.0
2,2-Dichloropropane	0.60	U	0.60	5.0
2-Chlorotoluene	0.85	U	0.85	5.0
4-Chlorotoluene	1.4	U	1.4	5.0
Acetone	25	U	25	120
Benzene	1.2	U	1.2	5.0
Bromobenzene	0.80	U	0.80	5.0
Chlorobromomethane	0.70	U	0.70	5.0
Dichlorobromomethane	1.2	U	1.2	5.0
Bromoform	2.5	U	2.5	5.0
Bromomethane	4.0	U	4.0	5.0
Carbon tetrachloride	2.5	U	2.5	5.0
Chlorobenzene	1.2	U	1.2	5.0
Chloroethane	5.0	U	5.0	5.0
Chloroform	0.70	U	0.70	5.0
Chloromethane	1.6	U	1.6	5.0
cis-1,2-Dichloroethene	0.75	U	0.75	5.0
cis-1,3-Dichloropropene	0.55	U	0.55	5.0
Chlorodibromomethane	0.50	U	0.50	5.0
Dichlorodifluoromethane	1.2	U	1.2	5.0
Ethylbenzene	0.55	U	0.55	5.0
Hexachlorobutadiene	2.0	U	2.0	5.0
Isopropylbenzene	0.50	U	0.50	5.0
Methylene Chloride	5.0	U	5.0	25
Methyl tert-butyl ether	1.0	U	1.0	50
2-Butanone (MEK)	5.0	U	5.0	50

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-1

Lab Sample ID: 680-56230-9

Date Sampled: 03/26/2010 1240

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0449.d
Dilution:	5.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1634		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1634			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	5.0	U	5.0	50
n-Butylbenzene	0.51	J	0.50	5.0
N-Propylbenzene	0.75	U	0.75	5.0
m-Xylene & p-Xylene	1.0	U	1.0	10
Naphthalene	5.0	U	5.0	25
o-Xylene	1.2	U	1.2	5.0
4-Isopropyltoluene	0.65	U	0.65	5.0
sec-Butylbenzene	0.80	U	0.80	5.0
Styrene	0.55	U	0.55	5.0
Trichloroethene	0.78	J	0.65	5.0
tert-Butylbenzene	0.60	U	0.60	5.0
Tetrachloroethene	350		0.75	5.0
Toluene	1.6	U	1.6	5.0
trans-1,2-Dichloroethene	1.0	U	1.0	5.0
trans-1,3-Dichloropropene	1.0	U	1.0	5.0
Trichlorofluoromethane	1.2	U	1.2	5.0
Vinyl chloride	0.90	U	0.90	5.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	112		75 - 120	
Dibromofluoromethane	109		75 - 121	
Toluene-d8 (Surr)	105		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DUP1

Lab Sample ID: 680-56230-10

Date Sampled: 03/26/2010 1300

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0443.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1506		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1506			

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.25	U	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	12	J	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.16	U	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	0.25	U	0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	0.29	J	0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	1.8		0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	0.10	U	0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.11	U	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.17	J	0.10	1.0
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.9	J	1.0	10

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DUP1

Lab Sample ID: 680-56230-10

Date Sampled: 03/26/2010 1300

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0443.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1506		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1506			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.10	U	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.22	J	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.55	J	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.12	J	0.11	1.0
Trichloroethene	1.8		0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	170		0.15	1.0
Toluene	0.35	J	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	102		75 - 120	
Dibromofluoromethane	116		75 - 121	
Toluene-d8 (Surr)	106		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-4-19

Lab Sample ID: 680-56230-11

Date Sampled: 03/26/2010 1340

Client Matrix: Solid

% Moisture: 17.4

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0194.d
Dilution:	1.0		Initial Weight/Volume:	9.5 g
Date Analyzed:	04/05/2010 1420		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane		1.5	U	1.5	3.2
1,1,1-Trichloroethane		0.38	U	0.38	3.2
1,1,2,2-Tetrachloroethane		1.0	U J	1.0	3.2
1,1,2-Trichloroethane		0.83	U	0.83	3.2
1,1-Dichloroethane		0.70	U	0.70	3.2
1,1-Dichloroethene		0.96	U	0.96	3.2
1,1-Dichloropropene		0.61	U	0.61	3.2
1,2,3-Trichlorobenzene		1.0	U	1.0	3.2
1,2,3-Trichloropropane		1.5	U J	1.5	3.2
1,2,4-Trichlorobenzene		0.57	U	0.57	3.2
1,2,4-Trimethylbenzene		0.89	U	0.89	3.2
1,2-Dichloroethane		0.70	U	0.70	3.2
1,2-Dichlorobenzene		0.83	U	0.83	3.2
1,2-Dibromo-3-Chloropropane		2.8	U J	2.8	6.4
1,2-Dichloropropane		0.55	U	0.55	3.2
Ethylene Dibromide		0.96	U	0.96	3.2
1,3,5-Trimethylbenzene		1.1	U	1.1	3.2
1,3-Dichlorobenzene		1.0	U	1.0	3.2
1,3-Dichloropropane		1.1	U	1.1	3.2
1,4-Dichlorobenzene		0.47	U	0.47	3.2
1-Chlorohexane		1.3	U	1.3	3.2
2,2-Dichloropropane		0.70	U	0.70	3.2
2-Chlorotoluene		1.3	U	1.3	3.2
4-Chlorotoluene		1.1	U	1.1	3.2
Acetone		7.7	J	7.0	32
Benzene		0.47	U	0.47	3.2
Bromobenzene		1.1	U	1.1	3.2
Chlorobromomethane		2.1	U	2.1	3.2
Dichlorobromomethane		0.62	U	0.62	3.2
Bromoform		0.96	U	0.96	3.2
Bromomethane		0.96	U	0.96	3.2
Carbon tetrachloride		0.53	U	0.53	3.2
Chlorobenzene		0.61	U Q	0.61	3.2
Chloroethane		1.7	U	1.7	3.2
Chloroform		0.70	U Q	0.70	3.2
Chloromethane		0.64	U	0.64	3.2
cis-1,2-Dichloroethene		0.89	U	0.89	3.2
cis-1,3-Dichloropropene		0.53	U	0.53	3.2
Chlorodibromomethane		1.1	U	1.1	3.2
Dichlorodifluoromethane		0.60	U	0.60	3.2
Ethylbenzene		0.83	U	0.83	3.2
Hexachlorobutadiene		2.0	U	2.0	3.2
Isopropylbenzene		1.2	U	1.2	3.2
Methylene Chloride		0.62	U	0.62	3.2
Methyl tert-butyl ether		0.64	U	0.64	32
2-Butanone (MEK)		1.5	U J	1.5	16

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: **SB-4-19**

Lab Sample ID: 680-56230-11

Date Sampled: 03/26/2010 1340

Client Matrix: Solid

% Moisture: 17.4

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0194.d
Dilution:	1.0		Initial Weight/Volume:	9.5 g
Date Analyzed:	04/05/2010 1420		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)		2.7	U J	2.7	16
n-Butylbenzene		1.5	U	1.5	3.2
N-Propylbenzene		1.7	U	1.7	3.2
m-Xylene & p-Xylene		1.7	U	1.7	6.4
Naphthalene		0.77	U J	0.77	3.2
o-Xylene		0.70	U Q	0.70	3.2
4-Isopropyltoluene		1.4	U	1.4	3.2
sec-Butylbenzene		1.3	U	1.3	3.2
Styrene		0.59	U	0.59	3.2
Trichloroethene		0.83	U	0.83	3.2
tert-Butylbenzene		1.1	U	1.1	3.2
Tetrachloroethene		3.3		1.2	3.2
Toluene		0.54	U	0.54	3.2
trans-1,2-Dichloroethene		0.40	U	0.40	3.2
trans-1,3-Dichloropropene		0.55	U	0.55	3.2
Trichlorofluoromethane		0.77	U	0.77	3.2
Vinyl chloride		0.96	U	0.96	3.2
Surrogate		%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene		109		65 - 124	
Dibromofluoromethane		84		65 - 124	
Toluene-d8 (Surr)		93		65 - 132	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-4-43Lab Sample ID: 680-56230-12
Client Matrix: Solid

% Moisture: 23.2

Date Sampled: 03/26/2010 1420
Date Received: 03/27/2010 1040**8260B Volatile Organic Compounds (GC/MS)**

Method:	8260B	Analysis Batch: 680-165027	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0214.d
Dilution:	40		Initial Weight/Volume:	9.8 g
Date Analyzed:	04/06/2010 1312		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane		64	U	64	130
1,1,1-Trichloroethane		16	U	16	130
1,1,2,2-Tetrachloroethane		43	U	43	130
1,1,2-Trichloroethane		35	U	35	130
1,1-Dichloroethane		29	U	29	130
1,1-Dichloroethene		40	U	40	130
1,1-Dichloropropene		25	U	25	130
1,2,3-Trichlorobenzene		43	U	43	130
1,2,3-Trichloropropane		64	U	64	130
1,2,4-Trichlorobenzene		24	U	24	130
1,2,4-Trimethylbenzene		37	U	37	130
1,2-Dichloroethane		29	U	29	130
1,2-Dichlorobenzene		35	U	35	130
1,2-Dibromo-3-Chloropropane		120	U	120	270
1,2-Dichloropropane		23	U	23	130
Ethylene Dibromide		40	U	40	130
1,3,5-Trimethylbenzene		45	U	45	130
1,3-Dichlorobenzene		43	U	43	130
1,3-Dichloropropane		48	U	48	130
1,4-Dichlorobenzene		20	U	20	130
1-Chlorohexane		56	U	56	130
2,2-Dichloropropane		29	U	29	130
2-Chlorotoluene		53	U	53	130
4-Chlorotoluene		45	U	45	130
Acetone		290	U	290	1300
Benzene		19	U	19	130
Bromobenzene		45	U	45	130
Chlorobromomethane		88	U	88	130
Dichlorobromomethane		26	U	26	130
Bromoform		40	U	40	130
Bromomethane		40	U	40	130
Carbon tetrachloride		22	U	22	130
Chlorobenzene		26	U	26	130
Chloroethane		72	U	72	130
Chloroform		29	U	29	130
Chloromethane		27	U	27	130
cis-1,2-Dichloroethene		37	U	37	130
cis-1,3-Dichloropropene		22	U	22	130
Chlorodibromomethane		45	U	45	130
Dichlorodifluoromethane		25	U	25	130
Ethylbenzene		35	U	35	130
Hexachlorobutadiene		82	U	82	130
Isopropylbenzene		51	U	51	130
Methylene Chloride		26	U	26	130
Methyl tert-butyl ether		27	U	27	1300
2-Butanone (MEK)		64	U	64	660

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-4-43Lab Sample ID: 680-56230-12
Client Matrix: Solid

% Moisture: 23.2

Date Sampled: 03/26/2010 1420
Date Received: 03/27/2010 1040**8260B Volatile Organic Compounds (GC/MS)**

Method:	8260B	Analysis Batch: 680-165027	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0214.d
Dilution:	40		Initial Weight/Volume:	9.8 g
Date Analyzed:	04/06/2010 1312		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)		110	U	110	660
n-Butylbenzene		64	U	64	130
N-Propylbenzene		72	U	72	130
m-Xylene & p-Xylene		69	U	69	270
Naphthalene		32	U	32	130
o-Xylene		29	U	29	130
4-Isopropyltoluene		58	U	58	130
sec-Butylbenzene		56	U	56	130
Styrene		25	U	25	130
Trichloroethene		35	U	35	130
tert-Butylbenzene		48	U	48	130
Tetrachloroethene		3700		51	130
Toluene		22	U	22	130
trans-1,2-Dichloroethene		17	U	17	130
trans-1,3-Dichloropropene		23	U	23	130
Trichlorofluoromethane		32	U	32	130
Vinyl chloride		40	U	40	130
Surrogate		%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene		127	J	65 - 124	
Dibromofluoromethane		95		65 - 124	
Toluene-d8 (Surr)		108		65 - 132	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-4Lab Sample ID: 680-56230-13
Client Matrix: WaterDate Sampled: 03/26/2010 1440
Date Received: 03/27/2010 1040**8260B Volatile Organic Compounds (GC/MS)**

Method:	8260B	Analysis Batch: 680-165000	Instrument ID:	MSA2
Preparation:	5030B		Lab File ID:	a032.d
Dilution:	50		Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 0224		Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 0224			

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	16	U	16	50
1,1,1-Trichloroethane	25	U	25	50
1,1,2,2-Tetrachloroethane	9.0	U	9.0	50
1,1,2-Trichloroethane	6.5	U	6.5	50
1,1-Dichloroethane	12	U	12	50
1,1-Dichloroethene	5.5	U	5.5	50
1,1-Dichloropropene	12	U	12	50
1,2,3-Trichlorobenzene	18	U	18	50
1,2,3-Trichloropropane	20	U	20	50
1,2,4-Trichlorobenzene	12	U	12	50
1,2,4-Trimethylbenzene	16	U	16	50
1,2-Dichloroethane	5.0	U	5.0	50
1,2-Dichlorobenzene	10	U	10	50
1,2-Dibromo-3-Chloropropane	22	U	22	50
1,2-Dichloropropane	6.5	U	6.5	50
Ethylene Dibromide	12	U	12	50
1,3,5-Trimethylbenzene	16	U	16	50
1,3-Dichlorobenzene	12	U	12	50
1,3-Dichloropropane	6.5	U	6.5	50
1,4-Dichlorobenzene	14	U	14	50
1-Chlorohexane	14	U	14	50
2,2-Dichloropropane	6.0	U	6.0	50
2-Chlorotoluene	8.5	U	8.5	50
4-Chlorotoluene	14	U	14	50
Acetone	250	U	250	1200
Benzene	12	U	12	50
Bromobenzene	8.0	U	8.0	50
Chlorobromomethane	7.0	U	7.0	50
Dichlorobromomethane	12	U	12	50
Bromoform	25	U	25	50
Bromomethane	40	U	40	50
Carbon tetrachloride	25	U	25	50
Chlorobenzene	12	U	12	50
Chloroethane	50	U	50	50
Chloroform	7.0	U	7.0	50
Chloromethane	16	U	16	50
cis-1,2-Dichloroethene	40	J	7.5	50
cis-1,3-Dichloropropene	5.5	U	5.5	50
Chlorodibromomethane	5.0	U	5.0	50
Dichlorodifluoromethane	12	U	12	50
Ethylbenzene	5.5	U	5.5	50
Hexachlorobutadiene	20	U	20	50
Isopropylbenzene	5.0	U	5.0	50
Methylene Chloride	50	U	50	250
Methyl tert-butyl ether	10	U	10	500
2-Butanone (MEK)	50	U	50	500

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-4

Lab Sample ID: 680-56230-13

Date Sampled: 03/26/2010 1440

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-165000	Instrument ID:	MSA2
Preparation:	5030B		Lab File ID:	a032.d
Dilution:	50		Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 0224		Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 0224			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	50	U	50	500
n-Butylbenzene	5.0	U	5.0	50
N-Propylbenzene	7.5	U	7.5	50
m-Xylene & p-Xylene	10	U	10	100
Naphthalene	50	U	50	250
o-Xylene	12	U	12	50
4-Isopropyltoluene	6.5	U	6.5	50
sec-Butylbenzene	8.0	U	8.0	50
Styrene	5.5	U	5.5	50
Trichloroethene	9.0	J	6.5	50
tert-Butylbenzene	6.0	U	6.0	50
Tetrachloroethene	2700		7.5	50
Toluene	16	U	16	50
trans-1,2-Dichloroethene	10	U	10	50
trans-1,3-Dichloropropene	10	U	10	50
Trichlorofluoromethane	12	U	12	50
Vinyl chloride	9.0	U	9.0	50
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	91		75 - 120	
Dibromofluoromethane	94		75 - 121	
Toluene-d8 (Surr)	96		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-3-10

Lab Sample ID: 680-56230-14

Date Sampled: 03/26/2010 1520

Client Matrix: Solid

% Moisture: 25.5

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0195.d
Dilution:	1.0		Initial Weight/Volume:	10.0 g
Date Analyzed:	04/05/2010 1442		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane		1.6	U	1.6	3.4
1,1,1-Trichloroethane		0.40	U	0.40	3.4
1,1,2,2-Tetrachloroethane		1.1	U	1.1	3.4
1,1,2-Trichloroethane		0.87	U	0.87	3.4
1,1-Dichloroethane		0.74	U	0.74	3.4
1,1-Dichloroethene		1.0	U	1.0	3.4
1,1-Dichloropropene		0.64	U	0.64	3.4
1,2,3-Trichlorobenzene		1.1	U	1.1	3.4
1,2,3-Trichloropropane		1.6	U	1.6	3.4
1,2,4-Trichlorobenzene		0.60	U	0.60	3.4
1,2,4-Trimethylbenzene		0.94	U	0.94	3.4
1,2-Dichloroethane		0.74	U	0.74	3.4
1,2-Dichlorobenzene		0.87	U	0.87	3.4
1,2-Dibromo-3-Chloropropane		3.0	U	3.0	6.7
1,2-Dichloropropane		0.58	U	0.58	3.4
Ethylene Dibromide		1.0	U	1.0	3.4
1,3,5-Trimethylbenzene		1.1	U	1.1	3.4
1,3-Dichlorobenzene		1.1	U	1.1	3.4
1,3-Dichloropropane		1.2	U	1.2	3.4
1,4-Dichlorobenzene		0.50	U	0.50	3.4
1-Chlorohexane		1.4	U	1.4	3.4
2,2-Dichloropropane		0.74	U	0.74	3.4
2-Chlorotoluene		1.3	U	1.3	3.4
4-Chlorotoluene		1.1	U	1.1	3.4
Acetone	27	J	7.4	34	
Benzene	0.49	U	0.49	3.4	
Bromobenzene	1.1	U	1.1	3.4	
Chlorobromomethane	2.2	U	2.2	3.4	
Dichlorobromomethane	0.65	U	0.65	3.4	
Bromoform	1.0	U	1.0	3.4	
Bromomethane	1.0	U	1.0	3.4	
Carbon tetrachloride	0.56	U	0.56	3.4	
Chlorobenzene	0.64	U Q	0.64	3.4	
Chloroethane	1.8	U	1.8	3.4	
Chloroform	0.74	U Q	0.74	3.4	
Chloromethane	0.67	U	0.67	3.4	
cis-1,2-Dichloroethene	0.94	U	0.94	3.4	
cis-1,3-Dichloropropene	0.56	U	0.56	3.4	
Chlorodibromomethane	1.1	U	1.1	3.4	
Dichlorodifluoromethane	0.63	U	0.63	3.4	
Ethylbenzene	0.87	U	0.87	3.4	
Hexachlorobutadiene	2.1	U	2.1	3.4	
Isopropylbenzene	1.3	U	1.3	3.4	
Methylene Chloride	0.66	U	0.66	3.4	
Methyl tert-butyl ether	0.67	U	0.67	34	
2-Butanone (MEK)	5.2	J	1.6	17	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: **SB-3-10**

Lab Sample ID: 680-56230-14

Date Sampled: 03/26/2010 1520

Client Matrix: Solid

% Moisture: 25.5

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0195.d
Dilution:	1.0		Initial Weight/Volume:	10.0 g
Date Analyzed:	04/05/2010 1442		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)		2.8	U	2.8	17
n-Butylbenzene		1.6	U	1.6	3.4
N-Propylbenzene		1.8	U	1.8	3.4
m-Xylene & p-Xylene		1.7	U	1.7	6.7
Naphthalene		0.81	U	0.81	3.4
o-Xylene		0.74	U Q	0.74	3.4
4-Isopropyltoluene		1.5	U	1.5	3.4
sec-Butylbenzene		1.4	U	1.4	3.4
Styrene		0.62	U	0.62	3.4
Trichloroethene		0.87	U	0.87	3.4
tert-Butylbenzene		1.2	U	1.2	3.4
Tetrachloroethene		1.3	U	1.3	3.4
Toluene		0.56	U	0.56	3.4
trans-1,2-Dichloroethene		0.42	U	0.42	3.4
trans-1,3-Dichloropropene		0.58	U	0.58	3.4
Trichlorofluoromethane		0.81	U	0.81	3.4
Vinyl chloride		1.0	U	1.0	3.4
Surrogate		%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene		107		65 - 124	
Dibromofluoromethane		84		65 - 124	
Toluene-d8 (Surr)		95		65 - 132	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: SB-3-35

Lab Sample ID: 680-56230-15

Date Sampled: 03/26/2010 1545

Client Matrix: Solid

% Moisture: 32.0

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0196.d
Dilution:	1.0		Initial Weight/Volume:	14.1 g
Date Analyzed:	04/05/2010 1505		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane		1.3	U	1.3	2.6
1,1,1-Trichloroethane		0.31	U	0.31	2.6
1,1,2,2-Tetrachloroethane		0.83	U	0.83	2.6
1,1,2-Trichloroethane		0.68	U	0.68	2.6
1,1-Dichloroethane		0.57	U	0.57	2.6
1,1-Dichloroethene		0.78	U	0.78	2.6
1,1-Dichloropropene		0.50	U	0.50	2.6
1,2,3-Trichlorobenzene		0.83	U	0.83	2.6
1,2,3-Trichloropropane		1.3	U	1.3	2.6
1,2,4-Trichlorobenzene		0.46	U	0.46	2.6
1,2,4-Trimethylbenzene		0.73	U	0.73	2.6
1,2-Dichloroethane		0.57	U	0.57	2.6
1,2-Dichlorobenzene		0.68	U	0.68	2.6
1,2-Dibromo-3-Chloropropane		2.3	U	2.3	5.2
1,2-Dichloropropane		0.45	U	0.45	2.6
Ethylene Dibromide		0.78	U	0.78	2.6
1,3,5-Trimethylbenzene		0.89	U	0.89	2.6
1,3-Dichlorobenzene		0.83	U	0.83	2.6
1,3-Dichloropropane		0.94	U	0.94	2.6
1,4-Dichlorobenzene		0.39	U	0.39	2.6
1-Chlorohexane		1.1	U	1.1	2.6
2,2-Dichloropropane		0.57	U	0.57	2.6
2-Chlorotoluene		1.0	U	1.0	2.6
4-Chlorotoluene		0.89	U	0.89	2.6
Acetone		18	J	5.7	26
Benzene		0.38	U	0.38	2.6
Bromobenzene		0.89	U	0.89	2.6
Chlorobromomethane		1.7	U	1.7	2.6
Dichlorobromomethane		0.51	U	0.51	2.6
Bromoform		0.78	U	0.78	2.6
Bromomethane		0.78	U	0.78	2.6
Carbon tetrachloride		0.43	U	0.43	2.6
Chlorobenzene		0.50	U Q	0.50	2.6
Chloroethane		1.4	U	1.4	2.6
Chloroform		0.57	U Q	0.57	2.6
Chloromethane		0.52	U	0.52	2.6
cis-1,2-Dichloroethene		0.73	U	0.73	2.6
cis-1,3-Dichloropropene		0.43	U	0.43	2.6
Chlorodibromomethane		0.89	U	0.89	2.6
Dichlorodifluoromethane		0.49	U	0.49	2.6
Ethylbenzene		0.68	U	0.68	2.6
Hexachlorobutadiene		1.6	U	1.6	2.6
Isopropylbenzene		0.99	U	0.99	2.6
Methylene Chloride		0.51	U	0.51	2.6
Methyl tert-butyl ether		0.52	U	0.52	26
2-Butanone (MEK)		1.9	J	1.3	13

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: **SB-3-35**

Lab Sample ID: 680-56230-15

Date Sampled: 03/26/2010 1545

Client Matrix: Solid

% Moisture: 32.0

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164913	Instrument ID:	MSM
Preparation:	5035	Prep Batch: 680-164296	Lab File ID:	m0196.d
Dilution:	1.0		Initial Weight/Volume:	14.1 g
Date Analyzed:	04/05/2010 1505		Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153			

Analyte	DryWt Corrected: Y	Result (ug/Kg)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)		2.2	U	2.2	13
n-Butylbenzene		1.3	U	1.3	2.6
N-Propylbenzene		1.4	U	1.4	2.6
m-Xylene & p-Xylene		1.4	U	1.4	5.2
Naphthalene		0.63	U	0.63	2.6
o-Xylene		0.57	U Q	0.57	2.6
4-Isopropyltoluene		1.1	U	1.1	2.6
sec-Butylbenzene		1.1	U	1.1	2.6
Styrene		0.48	U	0.48	2.6
Trichloroethene		0.68	U	0.68	2.6
tert-Butylbenzene		0.94	U	0.94	2.6
Tetrachloroethene		0.99	U	0.99	2.6
Toluene		0.44	U	0.44	2.6
trans-1,2-Dichloroethene		0.33	U	0.33	2.6
trans-1,3-Dichloropropene		0.45	U	0.45	2.6
Trichlorofluoromethane		0.63	U	0.63	2.6
Vinyl chloride		0.78	U	0.78	2.6
Surrogate		%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene		110		65 - 124	
Dibromofluoromethane		83		65 - 124	
Toluene-d8 (Surr)		96		65 - 132	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-3Lab Sample ID: 680-56230-16
Client Matrix: WaterDate Sampled: 03/26/2010 1615
Date Received: 03/27/2010 1040**8260B Volatile Organic Compounds (GC/MS)**

Method:	8260B	Analysis Batch:	680-164873	Instrument ID:	MSO
Preparation:	5030B			Lab File ID:	o0445.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1535			Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1535				

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.25	U	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	8.9	J	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.16	U	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	0.25	U	0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	0.14	U	0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	0.10	U	0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.11	U	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.11	J	0.10	1.0
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.0	U	1.0	10

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: DP-3

Lab Sample ID: 680-56230-16

Date Sampled: 03/26/2010 1615

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0445.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1535		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1535			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.10	U	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.20	U	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.15	J	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.11	U	0.11	1.0
Trichloroethene	0.13	U	0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	0.94	J	0.15	1.0
Toluene	0.33	U	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	97		75 - 120	
Dibromofluoromethane	112		75 - 121	
Toluene-d8 (Surr)	103		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: BLK2Lab Sample ID: 680-56230-17
Client Matrix: WaterDate Sampled: 03/26/2010 1630
Date Received: 03/27/2010 1040**8260B Volatile Organic Compounds (GC/MS)**

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0437.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1338		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1338			

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.25	U	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	5.5	J	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.16	U	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	6.7		0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	14		0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	2.3		0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.11	U	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.10	U	0.10	1.0
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.0	U	1.0	10

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: BLK2

Lab Sample ID: 680-56230-17

Date Sampled: 03/26/2010 1630

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0437.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1338		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1338			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.10	U	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.20	U	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.13	U	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.11	U	0.11	1.0
Trichloroethene	0.13	U	0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	0.15	U	0.15	1.0
Toluene	0.33	U	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	101		75 - 120	
Dibromofluoromethane	113		75 - 121	
Toluene-d8 (Surr)	105		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 680-56230-18

Date Sampled: 03/26/2010 0000

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0433.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1239		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1239			

Analyte	Result (ug/L)	Qualifier	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.25	U	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	5.0	U	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.21	J	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	0.25	U	0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	0.14	U	0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	0.10	U	0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.11	U	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.10	U	0.10	1.0
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.0	U	1.0	10

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 680-56230-18

Date Sampled: 03/26/2010 0000

Client Matrix: Water

Date Received: 03/27/2010 1040

8260B Volatile Organic Compounds (GC/MS)

Method:	8260B	Analysis Batch: 680-164873	Instrument ID:	MSO
Preparation:	5030B		Lab File ID:	o0433.d
Dilution:	1.0		Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1239		Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1239			

Analyte	Result (ug/L)	Qualifier	MDL	RL
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.10	U	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.20	U	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.13	U	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.12	J	0.11	1.0
Trichloroethene	0.13	U	0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	0.15	U	0.15	1.0
Toluene	0.33	U	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	%Rec	Qualifier	Acceptance Limits	
4-Bromofluorobenzene	104		75 - 120	
Dibromofluoromethane	112		75 - 121	
Toluene-d8 (Surr)	102		75 - 120	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

General Chemistry**Client Sample ID:** SB-1-18

Lab Sample ID: 680-56230-1

Date Sampled: 03/25/2010 1305

Client Matrix: Solid

Date Received: 03/27/2010 1040

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	18		%	0.010	0.010	1.0	Moisture Dry/Wt Corrected: N

Analysis Batch: 680-164292

Date Analyzed: 03/29/2010 1322

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

General Chemistry**Client Sample ID:** SB-1-43

Lab Sample ID: 680-56230-2

Date Sampled: 03/25/2010 1505

Client Matrix: Solid

Date Received: 03/27/2010 1040

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	20		%	0.010	0.010	1.0	Moisture Dry/Wt Corrected: N

Analysis Batch: 680-164292

Date Analyzed: 03/29/2010 1322

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

General Chemistry**Client Sample ID:** SB-2-15

Lab Sample ID: 680-56230-5

Client Matrix: Solid Date Sampled: 03/26/2010 1040

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	12	%	0.010	0.010	1.0	Moisture	Dry/Wt Corrected: N
Analysis Batch: 680-164292 Date Analyzed: 03/29/2010 1322							

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

General Chemistry**Client Sample ID:** DUP2

Lab Sample ID: 680-56230-6

Date Sampled: 03/26/2010 1100

Client Matrix: Solid

Date Received: 03/27/2010 1040

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	22		%	0.010	0.010	1.0	Moisture Dry/Wt Corrected: N

Analysis Batch: 680-164292

Date Analyzed: 03/29/2010 1322

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

General Chemistry**Client Sample ID:** SB-2-42

Lab Sample ID: 680-56230-7

Date Sampled: 03/26/2010 1105

Client Matrix: Solid

Date Received: 03/27/2010 1040

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	19		%	0.010	0.010	1.0	Moisture Dry/Wt Corrected: N

Analysis Batch: 680-164292

Date Analyzed: 03/29/2010 1322

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

General Chemistry**Client Sample ID:** SB-4-19

Lab Sample ID: 680-56230-11 Date Sampled: 03/26/2010 1340

Client Matrix: Solid Date Received: 03/27/2010 1040

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	17		%	0.010	0.010	1.0	Moisture DryWt Corrected: N

Analysis Batch: 680-164292 Date Analyzed: 03/29/2010 1322

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

General Chemistry**Client Sample ID:** SB-4-43

Lab Sample ID: 680-56230-12 Date Sampled: 03/26/2010 1420

Client Matrix: Solid Date Received: 03/27/2010 1040

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	23	%	0.010	0.010	1.0	Moisture	
	Analysis Batch: 680-164292	Date Analyzed: 03/29/2010 1322				DryWt Corrected: N	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

General Chemistry**Client Sample ID:** SB-3-10

Lab Sample ID: 680-56230-14 Date Sampled: 03/26/2010 1520
Client Matrix: Solid Date Received: 03/27/2010 1040

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	26	%	0.010	0.010	1.0	Moisture	
	Analysis Batch: 680-164292	Date Analyzed: 03/29/2010 1322				DryWt Corrected: N	

Analytical Data

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

General Chemistry**Client Sample ID:** SB-3-35

Lab Sample ID: 680-56230-15 Date Sampled: 03/26/2010 1545
Client Matrix: Solid Date Received: 03/27/2010 1040

Analyte	Result	Qual	Units	RL	RL	Dil	Method
Percent Moisture	32		%	0.010	0.010	1.0	Moisture
	Analysis Batch: 680-164292		Date Analyzed: 03/29/2010 1322				Dry/Wt Corrected: N

DATA REPORTING QUALIFIERS

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Section	Qualifier	Description
GC/MS VOA	J	Estimated: The analyte was positively identified; the quantitation is an estimation
	J	Estimated: The quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
	M	Manual integrated compound.
	Q	One or more quality control criteria failed.
	U	Undetected at the Limit of Detection.

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

**Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-164296**

Method: 8260B

Preparation: 5035

MS Lab Sample ID:	680-56230-11	Analysis Batch:	680-164913	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	680-164296	Lab File ID:	m0207.d
Dilution:	1.0			Initial Weight/Volume:	8.3 g
Date Analyzed:	04/05/2010 1915			Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153				
MSD Lab Sample ID:	680-56230-11	Analysis Batch:	680-165017	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	680-164296	Lab File ID:	m0228.d
Dilution:	1.0			Initial Weight/Volume:	9.7 g
Date Analyzed:	04/06/2010 1830			Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153				

Analyte	% Rec.		RPD	RPD Limit	MS Qual	MSD Qual
	MS	MSD				
1,1,1,2-Tetrachloroethane	88	83	72 - 124	21	50	
1,1,1-Trichloroethane	88	92	56 - 140	11	50	
1,1,2,2-Tetrachloroethane	157	158	65 - 130	15	50	J J
1,1,2-Trichloroethane	108	110	62 - 138	13	50	
1,1-Dichloroethane	90	89	65 - 130	17	50	
1,1-Dichloroethene	81	87	59 - 137	9	50	
1,1-Dichloropropene	93	97	55 - 141	12	50	
1,2,3-Trichlorobenzene	87	89	72 - 132	14	50	
1,2,3-Trichloropropane	165	157	65 - 132	20	50	J J
1,2,4-Trichlorobenzene	82	82	74 - 130	15	50	
1,2,4-Trimethylbenzene	84	78	68 - 130	22	50	
1,2-Dichloroethane	98	98	62 - 140	15	50	
1,2-Dichlorobenzene	104	103	75 - 123	17	50	
1,2-Dibromo-3-Chloropropane	185	178	62 - 140	20	50	J J
1,2-Dichloropropane	94	95	66 - 135	15	50	
Ethylene Dibromide	114	117	61 - 138	13	50	
1,3,5-Trimethylbenzene	91	88	67 - 131	19	50	
1,3-Dichlorobenzene	101	101	74 - 123	15	50	
1,3-Dichloropropane	106	108	60 - 137	14	50	
1,4-Dichlorobenzene	102	100	75 - 122	17	50	
2,2-Dichloropropane	75	81	59 - 138	8	50	
2-Chlorotoluene	96	92	73 - 123	20	50	
4-Chlorotoluene	99	100	75 - 123	15	50	
Acetone	180	190	16 - 202	9	50	
Benzene	94	93	63 - 130	17	50	
Bromobenzene	86	84	73 - 123	18	50	
Chlorobromomethane	70	94	12 - 159	14	50	
Dichlorobromomethane	103	106	64 - 137	13	50	
Bromoform	113	112	66 - 127	17	50	
Bromomethane	71	78	54 - 146	6	50	

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

**Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-164296**

Method: 8260B

Preparation: 5035

MS Lab Sample ID:	680-56230-11	Analysis Batch:	680-164913	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	680-164296	Lab File ID:	m0207.d
Dilution:	1.0			Initial Weight/Volume:	8.3 g
Date Analyzed:	04/05/2010 1915			Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153				
MSD Lab Sample ID:	680-56230-11	Analysis Batch:	680-165017	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	680-164296	Lab File ID:	m0228.d
Dilution:	1.0			Initial Weight/Volume:	9.7 g
Date Analyzed:	04/06/2010 1830			Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153				

Analyte	% Rec.		Limit	RPD	RPD Limit	MS Qual	MSD Qual
	MS	MSD					
Carbon tetrachloride	84	85	60 - 136	15	50		
Chlorobenzene	88	85	77 - 120	19	50		
Chloroethane	37	38	26 - 166	11	50		
Chloroform	71	82	68 - 127	2	50		
Chloromethane	104	122	46 - 137	0	50		
cis-1,2-Dichloroethene	83	82	58 - 143	16	50		
cis-1,3-Dichloropropene	91	96	66 - 137	10	50		
Chlorodibromomethane	96	91	70 - 126	21	50		
Dichlorodifluoromethane	78	87	17 - 163	5	50		
Ethylbenzene	90	87	77 - 121	19	50		
Hexachlorobutadiene	85	82	66 - 134	19	50		
Isopropylbenzene	93	87	74 - 124	22	50		
Methylene Chloride	94	96	65 - 126	13	50		
Methyl tert-butyl ether	110	114	68 - 128	12	50		
2-Butanone (MEK)	211	219	19 - 192	11	50	J	J
4-Methyl-2-pentanone (MIBK)	207	204	50 - 148	17	50	J	J
n-Butylbenzene	94	92	66 - 130	17	50		
N-Propylbenzene	99	96	74 - 124	19	50		
m-Xylene & p-Xylene	91	90	76 - 122	17	50		
Naphthalene	60	19	63 - 144	116	50	J	J
o-Xylene	88	85	76 - 122	19	50		
4-Isopropyltoluene	90	88	62 - 134	18	50		
sec-Butylbenzene	95	91	74 - 125	19	50		
Styrene	80	79	75 - 123	16	50		
Trichloroethene	81	85	68 - 133	11	50		
tert-Butylbenzene	92	88	75 - 123	19	50		
Tetrachloroethene	85	94	76 - 120	5	50		
Toluene	93	94	67 - 132	15	50		
trans-1,2-Dichloroethene	81	87	66 - 127	9	50		
trans-1,3-Dichloropropene	107	114	64 - 138	10	50		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

**Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-164296**

Method: 8260B

Preparation: 5035

MS Lab Sample ID:	680-56230-11	Analysis Batch:	680-164913	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	680-164296	Lab File ID:	m0207.d
Dilution:	1.0			Initial Weight/Volume:	8.3 g
Date Analyzed:	04/05/2010 1915			Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153				
MSD Lab Sample ID:	680-56230-11	Analysis Batch:	680-165017	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	680-164296	Lab File ID:	m0228.d
Dilution:	1.0			Initial Weight/Volume:	9.7 g
Date Analyzed:	04/06/2010 1830			Final Weight/Volume:	5 g
Date Prepared:	03/29/2010 1153				

Analyte	% Rec.		Limit	RPD	RPD Limit	MS Qual	MSD Qual
	MS	MSD					
Trichlorofluoromethane	76	81	33 - 152	9	50		
Vinyl chloride	89	99	56 - 139	4	50		
Surrogate		MS % Rec	MSD % Rec		Acceptance Limits		
4-Bromofluorobenzene		100		98		65 - 124	
Dibromofluoromethane		82		80		65 - 124	
Toluene-d8 (Surr)		88		89		65 - 132	

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-164873**Method: 8260B****Preparation: 5030B**

Lab Sample ID: MB 680-164873/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/05/2010 1210
Date Prepared: 04/05/2010 1210

Analysis Batch: 680-164873
Prep Batch: N/A
Units: ug/L

Instrument ID: MSO
Lab File ID: oq343.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.25	U	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	5.0	U	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.16	U	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	0.25	U	0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	0.14	U	0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	0.10	U	0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.11	U	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.10	U	0.10	1.0

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-164873**Method: 8260B****Preparation: 5030B**

Lab Sample ID: MB 680-164873/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/05/2010 1210
Date Prepared: 04/05/2010 1210

Analysis Batch: 680-164873
Prep Batch: N/A
Units: ug/L

Instrument ID: MSO
Lab File ID: oq343.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.0	U	1.0	10
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.158	J	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.20	U	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.13	U	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.11	U	0.11	1.0
Trichloroethene	0.13	U	0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	0.15	U	0.15	1.0
Toluene	0.33	U	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	% Rec	Acceptance Limits		
4-Bromofluorobenzene	104	75 - 120		
Dibromofluoromethane	115	75 - 121		
Toluene-d8 (Surr)	104	75 - 120		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-164873

Method: 8260B

Preparation: 5030B

LCS Lab Sample ID:	LCS 680-164873/4	Analysis Batch:	680-164873	Instrument ID:	MSO
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	oq333.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 0943			Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 0943				
LCSD Lab Sample ID:	LCSD 680-164873/5	Analysis Batch:	680-164873	Instrument ID:	MSO
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	oq335.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/05/2010 1012			Final Weight/Volume:	5 mL
Date Prepared:	04/05/2010 1012				

Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual	% Rec.
1,1,1,2-Tetrachloroethane	92	90	81 - 128	2	30			
1,1,1-Trichloroethane	102	98	76 - 127	4	30			
1,1,2,2-Tetrachloroethane	104	95	69 - 129	9	30			
1,1,2-Trichloroethane	99	95	75 - 121	4	30			
1,1-Dichloroethane	110	105	74 - 127	5	30			
1,1-Dichloroethene	113	108	62 - 141	4	30			
1,1-Dichloropropene	98	94	77 - 122	4	30			
1,2,3-Trichlorobenzene	92	95	60 - 132	3	30			
1,2,3-Trichloropropane	97	93	70 - 130	5	30			
1,2,4-Trichlorobenzene	81	87	60 - 135	8	30			
1,2,4-Trimethylbenzene	102	100	72 - 132	2	30			
1,2-Dichloroethane	92	88	66 - 132	4	30			
1,2-Dichlorobenzene	101	100	79 - 124	1	30			
1,2-Dibromo-3-Chloropropane	82	80	49 - 140	2	30			
1,2-Dichloropropane	96	94	73 - 124	2	30			
Ethylene Dibromide	106	102	80 - 121	4	30			
1,3,5-Trimethylbenzene	103	96	72 - 133	7	30			
1,3-Dichlorobenzene	100	98	78 - 125	2	30			
1,3-Dichloropropane	102	96	75 - 120	5	30			
1,4-Dichlorobenzene	103	101	81 - 122	3	30			
2,2-Dichloropropane	131	126	55 - 157	4	30			
2-Chlorotoluene	104	99	82 - 123	5	30			
4-Chlorotoluene	98	93	83 - 122	5	30			
Acetone	115	112	17 - 175	3	50			
Benzene	101	97	77 - 119	3	30			
Bromobenzene	104	94	80 - 124	11	30			
Chlorobromomethane	109	108	10 - 150	1	30			
Dichlorobromomethane	102	97	78 - 127	5	30			
Bromoform	95	95	62 - 133	0	30			
Bromomethane	88	90	12 - 184	3	50			
Carbon tetrachloride	108	102	71 - 135	5	30			
Chlorobenzene	101	100	85 - 116	2	30			
Chloroethane	82	68	40 - 165	18	50			

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-164873

Method: 8260B

Preparation: 5030B

LCS Lab Sample ID: LCS 680-164873/4
 Client Matrix: Water
 Dilution: 1.0
 Date Analyzed: 04/05/2010 0943
 Date Prepared: 04/05/2010 0943

Analysis Batch: 680-164873
 Prep Batch: N/A
 Units: ug/L

Instrument ID: MSO
 Lab File ID: oq333.d
 Initial Weight/Volume: 5 mL
 Final Weight/Volume: 5 mL

LCSD Lab Sample ID: LCSD 680-164873/5
 Client Matrix: Water
 Dilution: 1.0
 Date Analyzed: 04/05/2010 1012
 Date Prepared: 04/05/2010 1012

Analysis Batch: 680-164873
 Prep Batch: N/A
 Units: ug/L

Instrument ID: MSO
 Lab File ID: oq335.d
 Initial Weight/Volume: 5 mL
 Final Weight/Volume: 5 mL

Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual	% Rec.
Chloroform	110	108	82 - 120	2	30			
Chloromethane	87	87	48 - 142	1	50			
cis-1,2-Dichloroethene	113	111	69 - 134	1	30			
cis-1,3-Dichloropropene	109	104	76 - 126	4	30			
Chlorodibromomethane	114	112	75 - 133	2	30			
Dichlorodifluoromethane	116	118	34 - 154	1	30			
Ethylbenzene	100	98	86 - 116	2	30			
Hexachlorobutadiene	70	90	62 - 142	25	30			
Isopropylbenzene	104	93	82 - 121	11	30			
Methylene Chloride	113	107	70 - 125	5	30			
Methyl tert-butyl ether	115	110	77 - 121	4	30			
2-Butanone (MEK)	112	113	33 - 157	1	30			
4-Methyl-2-pentanone (MIBK)	102	101	40 - 151	2	30			
n-Butylbenzene	101	98	64 - 136	2	30			
N-Propylbenzene	106	97	80 - 126	8	30			
m-Xylene & p-Xylene	101	99	83 - 118	3	30			
Naphthalene	90	82	48 - 135	10	30			
o-Xylene	99	97	83 - 119	2	30			
4-Isopropyltoluene	103	100	63 - 139	3	30			
sec-Butylbenzene	100	97	77 - 126	3	30			
Styrene	103	101	82 - 122	2	30			
Trichloroethene	101	97	84 - 115	3	30			
tert-Butylbenzene	100	99	80 - 124	1	30			
Tetrachloroethene	103	100	76 - 126	3	30			
Toluene	99	96	81 - 117	4	30			
trans-1,2-Dichloroethene	106	101	72 - 131	4	30			
trans-1,3-Dichloropropene	113	107	73 - 128	5	30			
Trichlorofluoromethane	80	86	58 - 149	7	50			
Vinyl chloride	79	78	59 - 144	2	50			
Surrogate		LCS % Rec	LCSD % Rec			Acceptance Limits		
4-Bromofluorobenzene	102		89			75 - 120		
Dibromofluoromethane	114		115			75 - 121		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	102	98	75 - 120

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-164913

Method: 8260B

Preparation: N/A

Lab Sample ID: MB 680-164913/12
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 04/05/2010 1137
Date Prepared: N/A

Analysis Batch: 680-164913
Prep Batch: N/A
Units: ug/Kg

Instrument ID: MSM
Lab File ID: mq081.d
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
1,1,1,2-Tetrachloroethane	2.4	U	2.4	5.0
1,1,1-Trichloroethane	0.59	U	0.59	5.0
1,1,2,2-Tetrachloroethane	1.6	U	1.6	5.0
1,1,2-Trichloroethane	1.3	U	1.3	5.0
1,1-Dichloroethane	1.1	U	1.1	5.0
1,1-Dichloroethene	1.5	U	1.5	5.0
1,1-Dichloropropene	0.95	U	0.95	5.0
1,2,3-Trichlorobenzene	1.6	U	1.6	5.0
1,2,3-Trichloropropane	2.4	U	2.4	5.0
1,2,4-Trichlorobenzene	0.89	U	0.89	5.0
1,2,4-Trimethylbenzene	1.4	U	1.4	5.0
1,2-Dichloroethane	1.1	U	1.1	5.0
1,2-Dichlorobenzene	1.3	U	1.3	5.0
1,2-Dibromo-3-Chloropropane	4.4	U	4.4	10
1,2-Dichloropropane	0.86	U	0.86	5.0
Ethylene Dibromide	1.5	U	1.5	5.0
1,3,5-Trimethylbenzene	1.7	U	1.7	5.0
1,3-Dichlorobenzene	1.6	U	1.6	5.0
1,3-Dichloropropane	1.8	U	1.8	5.0
1,4-Dichlorobenzene	0.74	U	0.74	5.0
1-Chlorohexane	2.1	U	2.1	5.0
2,2-Dichloropropane	1.1	U	1.1	5.0
2-Chlorotoluene	2.0	U	2.0	5.0
4-Chlorotoluene	1.7	U	1.7	5.0
Acetone	11	U	11	50
Benzene	0.73	U	0.73	5.0
Bromobenzene	1.7	U	1.7	5.0
Chlorobromomethane	3.3	U	3.3	5.0
Dichlorobromomethane	0.97	U	0.97	5.0
Bromoform	1.5	U	1.5	5.0
Bromomethane	1.5	U	1.5	5.0
Carbon tetrachloride	0.83	U	0.83	5.0
Chlorobenzene	0.96	U	0.96	5.0
Chloroethane	2.7	U	2.7	5.0
Chloroform	1.1	U	1.1	5.0
Chloromethane	1.0	U	1.0	5.0
cis-1,2-Dichloroethene	1.4	U	1.4	5.0
cis-1,3-Dichloropropene	0.83	U	0.83	5.0
Chlorodibromomethane	1.7	U	1.7	5.0
Dichlorodifluoromethane	0.94	U	0.94	5.0
Ethylbenzene	1.3	U	1.3	5.0
Hexachlorobutadiene	3.1	U	3.1	5.0
Isopropylbenzene	1.9	U	1.9	5.0

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-164913

Method: 8260B

Preparation: N/A

Lab Sample ID: MB 680-164913/12
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 04/05/2010 1137
Date Prepared: N/A

Analysis Batch: 680-164913
Prep Batch: N/A
Units: ug/Kg

Instrument ID: MSM
Lab File ID: mq081.d
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Methylene Chloride	0.98	U	0.98	5.0
Methyl tert-butyl ether	1.0	U	1.0	50
2-Butanone (MEK)	2.4	U	2.4	25
4-Methyl-2-pentanone (MIBK)	4.2	U	4.2	25
n-Butylbenzene	2.4	U	2.4	5.0
N-Propylbenzene	2.7	U	2.7	5.0
m-Xylene & p-Xylene	2.6	U	2.6	10
Naphthalene	1.2	U	1.2	5.0
o-Xylene	1.1	U	1.1	5.0
4-Isopropyltoluene	2.2	U	2.2	5.0
sec-Butylbenzene	2.1	U	2.1	5.0
Styrene	0.93	U	0.93	5.0
Trichloroethene	1.3	U	1.3	5.0
tert-Butylbenzene	1.8	U	1.8	5.0
Tetrachloroethene	1.9	U	1.9	5.0
Toluene	0.84	U	0.84	5.0
trans-1,2-Dichloroethene	0.63	U	0.63	5.0
trans-1,3-Dichloropropene	0.87	U	0.87	5.0
Trichlorofluoromethane	1.2	U	1.2	5.0
Vinyl chloride	1.5	U	1.5	5.0
Surrogate	% Rec	Acceptance Limits		
4-Bromofluorobenzene	104	65 - 124		
Dibromofluoromethane	92	65 - 124		
Toluene-d8 (Surr)	95	65 - 132		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-164913

Method: 8260B

Preparation: N/A

LCS Lab Sample ID:	LCS 680-164913/10	Analysis Batch:	680-164913	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq077.d
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/05/2010 0944			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

LCSD Lab Sample ID:	LCSD 680-164913/11	Analysis Batch:	680-164913	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq078.d
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/05/2010 1006			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	LCS	LCSD	% Rec.	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	76	74		72 - 124	3	50		
1,1,1-Trichloroethane	69	67		56 - 140	3	50		
1,1,2,2-Tetrachloroethane	96	93		65 - 130	3	50		
1,1,2-Trichloroethane	81	78		62 - 138	3	50		
1,1-Dichloroethane	102	89		65 - 130	14	50		
1,1-Dichloroethene	97	85		59 - 137	13	50		
1,1-Dichloropropene	67	84		55 - 141	24	50		
1,2,3-Trichlorobenzene	78	77		72 - 132	2	50		
1,2,3-Trichloropropane	84	81		65 - 132	3	50		
1,2,4-Trichlorobenzene	75	78		74 - 130	4	50		
1,2,4-Trimethylbenzene	82	80		68 - 130	3	50		
1,2-Dichloroethane	69	78		62 - 140	12	50		
1,2-Dichlorobenzene	93	90		75 - 123	3	50		
1,2-Dibromo-3-Chloropropane	79	74		62 - 140	6	50		
1,2-Dichloropropane	83	79		66 - 135	5	50		
Ethylene Dibromide	82	78		61 - 138	5	50		
1,3,5-Trimethylbenzene	82	79		67 - 131	4	50		
1,3-Dichlorobenzene	93	90		74 - 123	3	50		
1,3-Dichloropropane	82	79		60 - 137	4	50		
1,4-Dichlorobenzene	90	90		75 - 122	0	50		
2,2-Dichloropropane	100	91		59 - 138	10	50		
2-Chlorotoluene	89	86		73 - 123	3	50		
4-Chlorotoluene	91	92		75 - 123	1	50		
Acetone	121	100		16 - 202	19	50		
Benzene	66	82		63 - 130	22	50		
Bromobenzene	78	73		73 - 123	6	50		
Chlorobromomethane	74	63		12 - 159	16	50		
Dichlorobromomethane	94	88		64 - 137	6	50		
Bromoform	76	72		66 - 127	5	50		
Bromomethane	99	90		54 - 146	9	50		
Carbon tetrachloride	66	81		60 - 136	20	50		
Chlorobenzene	78	75		77 - 120	4	50		
Chloroethane	83	71		26 - 166	16	50		Q

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-164913

Method: 8260B

Preparation: N/A

LCS Lab Sample ID:	LCS 680-164913/10	Analysis Batch:	680-164913	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq077.d
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/05/2010 0944			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

LCSD Lab Sample ID:	LCSD 680-164913/11	Analysis Batch:	680-164913	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq078.d
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/05/2010 1006			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Chloroform	77	65	68 - 127	17	50		Q
Chloromethane	89	98	46 - 137	10	50		
cis-1,2-Dichloroethene	96	84	58 - 143	13	50		
cis-1,3-Dichloropropene	82	81	66 - 137	1	50		
Chlorodibromomethane	79	74	70 - 126	7	50		
Dichlorodifluoromethane	82	74	17 - 163	10	50		
Ethylbenzene	82	78	77 - 121	5	50		
Hexachlorobutadiene	76	78	66 - 134	2	50		
Isopropylbenzene	82	78	74 - 124	4	50		
Methylene Chloride	108	90	65 - 126	18	50		
Methyl tert-butyl ether	114	99	68 - 128	15	50		
2-Butanone (MEK)	123	110	19 - 192	11	50		
4-Methyl-2-pentanone (MIBK)	90	85	50 - 148	5	50		
n-Butylbenzene	85	85	66 - 130	1	50		
N-Propylbenzene	92	88	74 - 124	4	50		
m-Xylene & p-Xylene	82	80	76 - 122	3	50		
Naphthalene	77	76	63 - 144	2	50		
o-Xylene	81	75	76 - 122	7	50		Q
4-Isopropyltoluene	82	80	62 - 134	3	50		
sec-Butylbenzene	84	79	74 - 125	5	50		
Styrene	95	87	75 - 123	9	50		
Trichloroethene	78	76	68 - 133	3	50		
tert-Butylbenzene	81	78	75 - 123	4	50		
Tetrachloroethene	79	77	76 - 120	2	50		
Toluene	85	83	67 - 132	3	50		
trans-1,2-Dichloroethene	99	83	66 - 127	18	50		
trans-1,3-Dichloropropene	95	92	64 - 138	4	50		
Trichlorofluoromethane	87	76	33 - 152	13	50		
Vinyl chloride	92	80	56 - 139	15	50		
Surrogate		LCS % Rec	LCSD % Rec		Acceptance Limits		
4-Bromofluorobenzene	92		88		65 - 124		
Dibromofluoromethane	75		66		65 - 124		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	82	79	65 - 132

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-164919

Method: 8260B

Preparation: N/A

Lab Sample ID: MB 680-164919/7
Client Matrix: Solid
Dilution: 40
Date Analyzed: 04/05/2010 1200
Date Prepared: N/A

Analysis Batch: 680-164919
Prep Batch: N/A
Units: ug/Kg

Instrument ID: MSM
Lab File ID: mq082.d
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
1,1,1,2-Tetrachloroethane	96	U	96	200
1,1,1-Trichloroethane	24	U	24	200
1,1,2,2-Tetrachloroethane	64	U	64	200
1,1,2-Trichloroethane	52	U	52	200
1,1-Dichloroethane	44	U	44	200
1,1-Dichloroethene	60	U	60	200
1,1-Dichloropropene	38	U	38	200
1,2,3-Trichlorobenzene	64	U	64	200
1,2,3-Trichloropropane	96	U	96	200
1,2,4-Trichlorobenzene	36	U	36	200
1,2,4-Trimethylbenzene	56	U	56	200
1,2-Dichloroethane	44	U	44	200
1,2-Dichlorobenzene	52	U	52	200
1,2-Dibromo-3-Chloropropane	180	U	180	400
1,2-Dichloropropane	34	U	34	200
Ethylene Dibromide	60	U	60	200
1,3,5-Trimethylbenzene	68	U	68	200
1,3-Dichlorobenzene	64	U	64	200
1,3-Dichloropropane	72	U	72	200
1,4-Dichlorobenzene	30	U	30	200
1-Chlorohexane	84	U	84	200
2,2-Dichloropropane	44	U	44	200
2-Chlorotoluene	80	U	80	200
4-Chlorotoluene	68	U	68	200
Acetone	440	U	440	2000
Benzene	29	U	29	200
Bromobenzene	68	U	68	200
Chlorobromomethane	130	U	130	200
Dichlorobromomethane	39	U	39	200
Bromoform	60	U	60	200
Bromomethane	60	U	60	200
Carbon tetrachloride	33	U	33	200
Chlorobenzene	38	U	38	200
Chloroethane	110	U	110	200
Chloroform	44	U	44	200
Chloromethane	40	U	40	200
cis-1,2-Dichloroethene	56	U	56	200
cis-1,3-Dichloropropene	33	U	33	200
Chlorodibromomethane	68	U	68	200
Dichlorodifluoromethane	38	U	38	200
Ethylbenzene	52	U	52	200
Hexachlorobutadiene	120	U	120	200
Isopropylbenzene	76	U	76	200

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-164919**Method: 8260B****Preparation: N/A**

Lab Sample ID: MB 680-164919/7
Client Matrix: Solid
Dilution: 40
Date Analyzed: 04/05/2010 1200
Date Prepared: N/A

Analysis Batch: 680-164919
Prep Batch: N/A
Units: ug/Kg

Instrument ID: MSM
Lab File ID: mq082.d
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Methylene Chloride	39	U	39	200
Methyl tert-butyl ether	40	U	40	2000
2-Butanone (MEK)	96	U	96	1000
4-Methyl-2-pentanone (MIBK)	170	U	170	1000
n-Butylbenzene	96	U	96	200
N-Propylbenzene	110	U	110	200
m-Xylene & p-Xylene	100	U	100	400
Naphthalene	48	U	48	200
o-Xylene	44	U	44	200
4-Isopropyltoluene	88	U	88	200
sec-Butylbenzene	84	U	84	200
Styrene	37	U	37	200
Trichloroethene	52	U	52	200
tert-Butylbenzene	72	U	72	200
Tetrachloroethene	76	U	76	200
Toluene	34	U	34	200
trans-1,2-Dichloroethene	25	U	25	200
trans-1,3-Dichloropropene	35	U	35	200
Trichlorofluoromethane	48	U	48	200
Vinyl chloride	60	U	60	200
Surrogate	% Rec	Acceptance Limits		
4-Bromofluorobenzene	92	65 - 124		
Dibromofluoromethane	73	65 - 124		
Toluene-d8 (Surr)	88	65 - 132		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-164919

Method: 8260B

Preparation: N/A

LCS Lab Sample ID:	LCS 680-164919/5	Analysis Batch:	680-164919	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq079.d
Dilution:	40	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/05/2010 1029			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

LCSD Lab Sample ID:	LCSD 680-164919/6	Analysis Batch:	680-164919	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq080.d
Dilution:	40	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/05/2010 1052			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	LCS	LCSD	% Rec.	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	82	102	72 - 124	21	50			
1,1,1-Trichloroethane	77	113	56 - 140	38	50			
1,1,2,2-Tetrachloroethane	104	123	65 - 130	17	50			
1,1,2-Trichloroethane	90	108	62 - 138	18	50			
1,1-Dichloroethane	95	119	65 - 130	22	50			
1,1-Dichloroethene	87	111	59 - 137	24	50			
1,1-Dichloropropene	94	113	55 - 141	19	50			
1,2,3-Trichlorobenzene	82	104	72 - 132	23	50			
1,2,3-Trichloropropane	102	122	65 - 132	18	50			
1,2,4-Trichlorobenzene	83	102	74 - 130	21	50			
1,2,4-Trimethylbenzene	89	110	68 - 130	21	50			
1,2-Dichloroethane	87	107	62 - 140	21	50			
1,2-Dichlorobenzene	98	119	75 - 123	20	50			
1,2-Dibromo-3-Chloropropane	95	115	62 - 140	19	50			
1,2-Dichloropropane	90	112	66 - 135	21	50			
Ethylene Dibromide	90	108	61 - 138	18	50			
1,3,5-Trimethylbenzene	89	111	67 - 131	22	50			
1,3-Dichlorobenzene	98	121	74 - 123	21	50			
1,3-Dichloropropane	90	107	60 - 137	17	50			
1,4-Dichlorobenzene	98	119	75 - 122	19	50			
2,2-Dichloropropane	91	114	59 - 138	23	50			
2-Chlorotoluene	98	119	73 - 123	20	50			
4-Chlorotoluene	95	121	75 - 123	24	50			
Acetone	127	141	16 - 202	10	50			
Benzene	92	114	63 - 130	21	50			
Bromobenzene	84	99	73 - 123	16	50			
Chlorobromomethane	67	86	12 - 159	25	50			
Dichlorobromomethane	99	120	64 - 137	19	50			
Bromoform	89	107	66 - 127	19	50			
Bromomethane	94	110	54 - 146	16	50			
Carbon tetrachloride	86	105	60 - 136	19	50			
Chlorobenzene	84	103	77 - 120	21	50			
Chloroethane	56	71	26 - 166	24	50			

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-164919

Method: 8260B

Preparation: N/A

LCS Lab Sample ID: LCS 680-164919/5
 Client Matrix: Solid
 Dilution: 40
 Date Analyzed: 04/05/2010 1029
 Date Prepared: N/A

Analysis Batch: 680-164919
 Prep Batch: N/A
 Units: ug/Kg

Instrument ID: MSM
 Lab File ID: mq079.d
 Initial Weight/Volume: 5 g
 Final Weight/Volume: 5 mL

LCSD Lab Sample ID: LCSD 680-164919/6
 Client Matrix: Solid
 Dilution: 40
 Date Analyzed: 04/05/2010 1052
 Date Prepared: N/A

Analysis Batch: 680-164919
 Prep Batch: N/A
 Units: ug/Kg

Instrument ID: MSM
 Lab File ID: mq080.d
 Initial Weight/Volume: 5 g
 Final Weight/Volume: 5 mL

Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Chloroform	70	86	68 - 127	21	50		
Chloromethane	106	106	46 - 137	0	50		
cis-1,2-Dichloroethene	86	113	58 - 143	26	50		
cis-1,3-Dichloropropene	89	106	66 - 137	17	50		
Chlorodibromomethane	88	107	70 - 126	20	50		
Dichlorodifluoromethane	75	94	17 - 163	23	50		
Ethylbenzene	87	109	77 - 121	22	50		
Hexachlorobutadiene	83	104	66 - 134	22	50		
Isopropylbenzene	88	108	74 - 124	20	50		
Methylene Chloride	98	123	65 - 126	22	50		
Methyl tert-butyl ether	104	128	68 - 128	20	50		
2-Butanone (MEK)	119	145	19 - 192	19	50		
4-Methyl-2-pentanone (MIBK)	100	121	50 - 148	20	50		
n-Butylbenzene	91	113	66 - 130	22	50		
N-Propylbenzene	96	117	74 - 124	20	50		
m-Xylene & p-Xylene	89	111	76 - 122	22	50		
Naphthalene	86	107	63 - 144	21	50		
o-Xylene	87	105	76 - 122	19	50		
4-Isopropyltoluene	87	109	62 - 134	23	50		
sec-Butylbenzene	87	110	74 - 125	23	50		
Styrene	100	121	75 - 123	18	50		
Trichloroethene	84	102	68 - 133	19	50		
tert-Butylbenzene	89	110	75 - 123	22	50		
Tetrachloroethene	85	102	76 - 120	18	50		
Toluene	93	113	67 - 132	19	50		
trans-1,2-Dichloroethene	91	110	66 - 127	19	50		
trans-1,3-Dichloropropene	102	123	64 - 138	18	50		
Trichlorofluoromethane	82	103	33 - 152	22	50		
Vinyl chloride	86	109	56 - 139	23	50		
Surrogate		LCS % Rec	LCSD % Rec		Acceptance Limits		
4-Bromofluorobenzene	97		119		65 - 124		
Dibromofluoromethane	72		106		65 - 124		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	88	111	65 - 132

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165000**Method: 8260B****Preparation: 5030B**

Lab Sample ID: MB 680-165000/8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/06/2010 1821
Date Prepared: 04/06/2010 1821

Analysis Batch: 680-165000
Prep Batch: N/A
Units: ug/L

Instrument ID: MSA2
Lab File ID: aq046.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.25	U	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	5.0	U	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.16	U	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	0.25	U	0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	0.14	U	0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	0.10	U	0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.11	U	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.10	U	0.10	1.0

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165000**Method: 8260B****Preparation: 5030B**

Lab Sample ID: MB 680-165000/8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/06/2010 1821
Date Prepared: 04/06/2010 1821

Analysis Batch: 680-165000
Prep Batch: N/A
Units: ug/L

Instrument ID: MSA2
Lab File ID: aq046.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.0	U	1.0	10
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.10	U	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.20	U	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.13	U	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.11	U	0.11	1.0
Trichloroethene	0.13	U	0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	0.15	U	0.15	1.0
Toluene	0.33	U	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	% Rec	Acceptance Limits		
4-Bromofluorobenzene	91	75 - 120		
Dibromofluoromethane	98	75 - 121		
Toluene-d8 (Surr)	94	75 - 120		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/**Lab Control Sample Duplicate Recovery Report - Batch: 680-165000****Method: 8260B****Preparation: 5030B**

LCS Lab Sample ID:	LCS 680-165000/5	Analysis Batch:	680-165000	Instrument ID:	MSA2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq038.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/06/2010 1624			Final Weight/Volume:	5 mL
Date Prepared:	04/06/2010 1624				
LCSD Lab Sample ID:	LCSD 680-165000/6	Analysis Batch:	680-165000	Instrument ID:	MSA2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq040.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/06/2010 1653			Final Weight/Volume:	5 mL
Date Prepared:	04/06/2010 1653				

Analyte	LCS	LCSD	% Rec.	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	90	88	81 - 128	2	30			
1,1,1-Trichloroethane	97	99	76 - 127	2	30			
1,1,2,2-Tetrachloroethane	104	103	69 - 129	1	30			
1,1,2-Trichloroethane	98	99	75 - 121	1	30			
1,1-Dichloroethane	99	99	74 - 127	0	30			
1,1-Dichloroethene	96	96	62 - 141	0	30			
1,1-Dichloropropene	105	106	77 - 122	1	30			
1,2,3-Trichlorobenzene	108	107	60 - 132	1	30			
1,2,3-Trichloropropane	112	113	70 - 130	1	30			
1,2,4-Trichlorobenzene	106	105	60 - 135	0	30			
1,2,4-Trimethylbenzene	100	99	72 - 132	1	30			
1,2-Dichloroethane	92	94	66 - 132	2	30			
1,2-Dichlorobenzene	105	105	79 - 124	0	30			
1,2-Dibromo-3-Chloropropane	92	92	49 - 140	0	30			
1,2-Dichloropropane	101	100	73 - 124	0	30			
Ethylene Dibromide	97	98	80 - 121	1	30			
1,3,5-Trimethylbenzene	98	98	72 - 133	0	30			
1,3-Dichlorobenzene	105	105	78 - 125	0	30			
1,3-Dichloropropane	102	103	75 - 120	1	30			
1,4-Dichlorobenzene	103	101	81 - 122	2	30			
2,2-Dichloropropane	110	104	55 - 157	5	30			
2-Chlorotoluene	103	101	82 - 123	1	30			
4-Chlorotoluene	106	106	83 - 122	0	30			
Acetone	101	101	17 - 175	0	50			
Benzene	103	104	77 - 119	1	30			
Bromobenzene	104	103	80 - 124	1	30			
Chlorobromomethane	100	100	10 - 150	0	30			
Dichlorobromomethane	100	98	78 - 127	2	30			
Bromoform	96	97	62 - 133	0	30			
Bromomethane	55	64	12 - 184	14	50			
Carbon tetrachloride	92	93	71 - 135	2	30			
Chlorobenzene	99	97	85 - 116	1	30			
Chloroethane	102	100	40 - 165	2	50			

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-165000

Method: 8260B

Preparation: 5030B

LCS Lab Sample ID:	LCS 680-165000/5	Analysis Batch:	680-165000	Instrument ID:	MSA2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq038.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/06/2010 1624			Final Weight/Volume:	5 mL
Date Prepared:	04/06/2010 1624				

LCSD Lab Sample ID:	LCSD 680-165000/6	Analysis Batch:	680-165000	Instrument ID:	MSA2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq040.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/06/2010 1653			Final Weight/Volume:	5 mL
Date Prepared:	04/06/2010 1653				

Analyte	% Rec.						
	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Chloroform	98	96	82 - 120	3	30		
Chloromethane	94	98	48 - 142	4	50		
cis-1,2-Dichloroethene	98	96	69 - 134	2	30		
cis-1,3-Dichloropropene	110	109	76 - 126	0	30		
Chlorodibromomethane	87	85	75 - 133	3	30		
Dichlorodifluoromethane	118	115	34 - 154	3	30		
Ethylbenzene	105	104	86 - 116	1	30		
Hexachlorobutadiene	109	107	62 - 142	2	30		
Isopropylbenzene	101	100	82 - 121	1	30		
Methylene Chloride	113	113	70 - 125	0	30		
Methyl tert-butyl ether	108	97	77 - 121	10	30		
2-Butanone (MEK)	105	104	33 - 157	1	30		
4-Methyl-2-pentanone (MIBK)	105	106	40 - 151	1	30		
n-Butylbenzene	111	110	64 - 136	1	30		
N-Propylbenzene	110	110	80 - 126	0	30		
m-Xylene & p-Xylene	100	99	83 - 118	1	30		
Naphthalene	113	113	48 - 135	0	30		
o-Xylene	104	104	83 - 119	0	30		
4-Isopropyltoluene	100	99	63 - 139	1	30		
sec-Butylbenzene	99	97	77 - 126	2	30		
Styrene	105	103	82 - 122	2	30		
Trichloroethene	98	100	84 - 115	2	30		
tert-Butylbenzene	113	113	80 - 124	1	30		
Tetrachloroethene	100	100	76 - 126	0	30		
Toluene	102	101	81 - 117	0	30		
trans-1,2-Dichloroethene	88	82	72 - 131	6	30		
trans-1,3-Dichloropropene	98	99	73 - 128	1	30		
Trichlorofluoromethane	106	105	58 - 149	0	50		
Vinyl chloride	97	95	59 - 144	2	50		
Surrogate		LCS % Rec	LCSD % Rec		Acceptance Limits		
4-Bromofluorobenzene	95	96			75 - 120		
Dibromofluoromethane	96	95			75 - 121		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	93	94	75 - 120

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165017

Method: 8260B

Preparation: N/A

Lab Sample ID: MB 680-165017/11
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 04/06/2010 1153
Date Prepared: N/A

Analysis Batch: 680-165017
Prep Batch: N/A
Units: ug/Kg

Instrument ID: MSM
Lab File ID: mq090.d
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
1,1,1,2-Tetrachloroethane	2.4	U	2.4	5.0
1,1,1-Trichloroethane	0.59	U	0.59	5.0
1,1,2,2-Tetrachloroethane	1.6	U	1.6	5.0
1,1,2-Trichloroethane	1.3	U	1.3	5.0
1,1-Dichloroethane	1.1	U	1.1	5.0
1,1-Dichloroethene	1.5	U	1.5	5.0
1,1-Dichloropropene	0.95	U	0.95	5.0
1,2,3-Trichlorobenzene	1.6	U	1.6	5.0
1,2,3-Trichloropropane	2.4	U	2.4	5.0
1,2,4-Trichlorobenzene	0.89	U	0.89	5.0
1,2,4-Trimethylbenzene	1.4	U	1.4	5.0
1,2-Dichloroethane	1.1	U	1.1	5.0
1,2-Dichlorobenzene	1.3	U	1.3	5.0
1,2-Dibromo-3-Chloropropane	4.4	U	4.4	10
1,2-Dichloropropane	0.86	U	0.86	5.0
Ethylene Dibromide	1.5	U	1.5	5.0
1,3,5-Trimethylbenzene	1.7	U	1.7	5.0
1,3-Dichlorobenzene	1.6	U	1.6	5.0
1,3-Dichloropropane	1.8	U	1.8	5.0
1,4-Dichlorobenzene	0.74	U	0.74	5.0
1-Chlorohexane	2.1	U	2.1	5.0
2,2-Dichloropropane	1.1	U	1.1	5.0
2-Chlorotoluene	2.0	U	2.0	5.0
4-Chlorotoluene	1.7	U	1.7	5.0
Acetone	11	U	11	50
Benzene	0.73	U	0.73	5.0
Bromobenzene	1.7	U	1.7	5.0
Chlorobromomethane	3.3	U	3.3	5.0
Dichlorobromomethane	0.97	U	0.97	5.0
Bromoform	1.5	U	1.5	5.0
Bromomethane	1.5	U	1.5	5.0
Carbon tetrachloride	0.83	U	0.83	5.0
Chlorobenzene	0.96	U	0.96	5.0
Chloroethane	2.7	U	2.7	5.0
Chloroform	1.1	U	1.1	5.0
Chloromethane	1.0	U	1.0	5.0
cis-1,2-Dichloroethene	1.4	U	1.4	5.0
cis-1,3-Dichloropropene	0.83	U	0.83	5.0
Chlorodibromomethane	1.7	U	1.7	5.0
Dichlorodifluoromethane	0.94	U	0.94	5.0
Ethylbenzene	1.3	U	1.3	5.0
Hexachlorobutadiene	3.1	U	3.1	5.0
Isopropylbenzene	1.9	U	1.9	5.0

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165017

Method: 8260B

Preparation: N/A

Lab Sample ID: MB 680-165017/11
Client Matrix: Solid
Dilution: 1.0
Date Analyzed: 04/06/2010 1153
Date Prepared: N/A

Analysis Batch: 680-165017
Prep Batch: N/A
Units: ug/Kg

Instrument ID: MSM
Lab File ID: mq090.d
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Methylene Chloride	0.98	U	0.98	5.0
Methyl tert-butyl ether	1.0	U	1.0	50
2-Butanone (MEK)	2.4	U	2.4	25
4-Methyl-2-pentanone (MIBK)	4.2	U	4.2	25
n-Butylbenzene	2.4	U	2.4	5.0
N-Propylbenzene	2.7	U	2.7	5.0
m-Xylene & p-Xylene	2.6	U	2.6	10
Naphthalene	1.2	U	1.2	5.0
o-Xylene	1.1	U	1.1	5.0
4-Isopropyltoluene	2.2	U	2.2	5.0
sec-Butylbenzene	2.1	U	2.1	5.0
Styrene	0.93	U	0.93	5.0
Trichloroethene	1.3	U	1.3	5.0
tert-Butylbenzene	1.8	U	1.8	5.0
Tetrachloroethene	1.9	U	1.9	5.0
Toluene	0.84	U	0.84	5.0
trans-1,2-Dichloroethene	0.63	U	0.63	5.0
trans-1,3-Dichloropropene	0.87	U	0.87	5.0
Trichlorofluoromethane	1.2	U	1.2	5.0
Vinyl chloride	1.5	U	1.5	5.0
Surrogate	% Rec	Acceptance Limits		
4-Bromofluorobenzene	104	65 - 124		
Dibromofluoromethane	89	65 - 124		
Toluene-d8 (Surr)	94	65 - 132		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-165017

Method: 8260B

Preparation: N/A

LCS Lab Sample ID:	LCS 680-165017/9	Analysis Batch:	680-165017	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq086.d
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/06/2010 0959			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

LCSD Lab Sample ID:	LCSD 680-165017/10	Analysis Batch:	680-165017	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq087.d
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/06/2010 1022			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	LCS	LCSD	% Rec.	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	84	74		72 - 124	12	50		
1,1,1-Trichloroethane	91	82		56 - 140	10	50		
1,1,2,2-Tetrachloroethane	112	98		65 - 130	14	50		
1,1,2-Trichloroethane	96	86		62 - 138	12	50		
1,1-Dichloroethane	100	92		65 - 130	9	50		
1,1-Dichloroethene	94	85		59 - 137	10	50		
1,1-Dichloropropene	99	86		55 - 141	15	50		
1,2,3-Trichlorobenzene	82	80		72 - 132	3	50		
1,2,3-Trichloropropane	100	91		65 - 132	9	50		
1,2,4-Trichlorobenzene	82	79		74 - 130	3	50		
1,2,4-Trimethylbenzene	90	81		68 - 130	11	50		
1,2-Dichloroethane	93	84		62 - 140	10	50		
1,2-Dichlorobenzene	101	92		75 - 123	9	50		
1,2-Dibromo-3-Chloropropane	91	80		62 - 140	12	50		
1,2-Dichloropropane	98	86		66 - 135	13	50		
Ethylene Dibromide	94	84		61 - 138	11	50		
1,3,5-Trimethylbenzene	89	80		67 - 131	11	50		
1,3-Dichlorobenzene	102	91		74 - 123	11	50		
1,3-Dichloropropane	95	85		60 - 137	11	50		
1,4-Dichlorobenzene	101	91		75 - 122	11	50		
2,2-Dichloropropane	99	86		59 - 138	13	50		
2-Chlorotoluene	97	87		73 - 123	11	50		
4-Chlorotoluene	103	90		75 - 123	13	50		
Acetone	133	117		16 - 202	13	50		
Benzene	97	86		63 - 130	12	50		
Bromobenzene	87	74		73 - 123	15	50		
Chlorobromomethane	73	69		12 - 159	6	50		
Dichlorobromomethane	107	93		64 - 137	14	50		
Bromoform	89	79		66 - 127	12	50		
Bromomethane	88	87		54 - 146	1	50		
Carbon tetrachloride	90	78		60 - 136	13	50		
Chlorobenzene	85	77		77 - 120	10	50		
Chloroethane	74	67		26 - 166	10	50		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-165017

Method: 8260B

Preparation: N/A

LCS Lab Sample ID:	LCS 680-165017/9	Analysis Batch:	680-165017	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq086.d
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/06/2010 0959			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

LCSD Lab Sample ID:	LCSD 680-165017/10	Analysis Batch:	680-165017	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq087.d
Dilution:	1.0	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/06/2010 1022			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	LCS	LCSD	% Rec.	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Chloroform	73	69	68 - 127	6	50			
Chloromethane	116	105	46 - 137	10	50			
cis-1,2-Dichloroethene	97	91	58 - 143	6	50			
cis-1,3-Dichloropropene	93	85	66 - 137	10	50			
Chlorodibromomethane	87	77	70 - 126	11	50			
Dichlorodifluoromethane	78	70	17 - 163	11	50			
Ethylbenzene	88	79	77 - 121	10	50			
Hexachlorobutadiene	85	77	66 - 134	10	50			
Isopropylbenzene	89	80	74 - 124	11	50			
Methylene Chloride	109	98	65 - 126	10	50			
Methyl tert-butyl ether	113	105	68 - 128	7	50			
2-Butanone (MEK)	129	119	19 - 192	8	50			
4-Methyl-2-pentanone (MIBK)	109	97	50 - 148	11	50			
n-Butylbenzene	95	85	66 - 130	11	50			
N-Propylbenzene	100	92	74 - 124	8	50			
m-Xylene & p-Xylene	92	80	76 - 122	14	50			
Naphthalene	85	81	63 - 144	4	50			
o-Xylene	87	79	76 - 122	10	50			
4-Isopropyltoluene	90	80	62 - 134	12	50			
sec-Butylbenzene	91	81	74 - 125	11	50			
Styrene	105	94	75 - 123	11	50			
Trichloroethene	88	81	68 - 133	9	50			
tert-Butylbenzene	89	81	75 - 123	10	50			
Tetrachloroethene	87	77	76 - 120	12	50			
Toluene	96	86	67 - 132	10	50			
trans-1,2-Dichloroethene	98	86	66 - 127	13	50			
trans-1,3-Dichloropropene	109	97	64 - 138	12	50			
Trichlorofluoromethane	86	78	33 - 152	10	50			
Vinyl chloride	93	86	56 - 139	8	50			
Surrogate		LCS % Rec		LCSD % Rec		Acceptance Limits		
4-Bromofluorobenzene		101		90		65 - 124		
Dibromofluoromethane		91		83		65 - 124		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	92	81	65 - 132

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165027**Method: 8260B****Preparation: N/A**

Lab Sample ID: MB 680-165027/11
Client Matrix: Solid
Dilution: 40
Date Analyzed: 04/06/2010 1244
Date Prepared: N/A

Analysis Batch: 680-165027
Prep Batch: N/A
Units: ug/Kg

Instrument ID: MSM
Lab File ID: mq092.d
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
1,1,1,2-Tetrachloroethane	96	U	96	200
1,1,1-Trichloroethane	24	U	24	200
1,1,2,2-Tetrachloroethane	64	U	64	200
1,1,2-Trichloroethane	52	U	52	200
1,1-Dichloroethane	44	U	44	200
1,1-Dichloroethene	60	U	60	200
1,1-Dichloropropene	38	U	38	200
1,2,3-Trichlorobenzene	64	U	64	200
1,2,3-Trichloropropane	96	U	96	200
1,2,4-Trichlorobenzene	36	U	36	200
1,2,4-Trimethylbenzene	56	U	56	200
1,2-Dichloroethane	44	U	44	200
1,2-Dichlorobenzene	52	U	52	200
1,2-Dibromo-3-Chloropropane	180	U	180	400
1,2-Dichloropropane	34	U	34	200
Ethylene Dibromide	60	U	60	200
1,3,5-Trimethylbenzene	68	U	68	200
1,3-Dichlorobenzene	64	U	64	200
1,3-Dichloropropane	72	U	72	200
1,4-Dichlorobenzene	30	U	30	200
1-Chlorohexane	84	U	84	200
2,2-Dichloropropane	44	U	44	200
2-Chlorotoluene	80	U	80	200
4-Chlorotoluene	68	U	68	200
Acetone	440	U	440	2000
Benzene	29	U	29	200
Bromobenzene	68	U	68	200
Chlorobromomethane	130	U	130	200
Dichlorobromomethane	39	U	39	200
Bromoform	60	U	60	200
Bromomethane	60	U	60	200
Carbon tetrachloride	33	U	33	200
Chlorobenzene	38	U	38	200
Chloroethane	110	U	110	200
Chloroform	44	U	44	200
Chloromethane	40	U	40	200
cis-1,2-Dichloroethene	56	U	56	200
cis-1,3-Dichloropropene	33	U	33	200
Chlorodibromomethane	68	U	68	200
Dichlorodifluoromethane	38	U	38	200
Ethylbenzene	52	U	52	200
Hexachlorobutadiene	120	U	120	200
Isopropylbenzene	76	U	76	200

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165027**Method: 8260B****Preparation: N/A**

Lab Sample ID: MB 680-165027/11
Client Matrix: Solid
Dilution: 40
Date Analyzed: 04/06/2010 1244
Date Prepared: N/A

Analysis Batch: 680-165027
Prep Batch: N/A
Units: ug/Kg

Instrument ID: MSM
Lab File ID: mq092.d
Initial Weight/Volume: 5 g
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Methylene Chloride	39	U	39	200
Methyl tert-butyl ether	40	U	40	2000
2-Butanone (MEK)	96	U	96	1000
4-Methyl-2-pentanone (MIBK)	170	U	170	1000
n-Butylbenzene	96	U	96	200
N-Propylbenzene	110	U	110	200
m-Xylene & p-Xylene	100	U	100	400
Naphthalene	48	U	48	200
o-Xylene	44	U	44	200
4-Isopropyltoluene	88	U	88	200
sec-Butylbenzene	84	U	84	200
Styrene	37	U	37	200
Trichloroethene	52	U	52	200
tert-Butylbenzene	72	U	72	200
Tetrachloroethene	76	U	76	200
Toluene	34	U	34	200
trans-1,2-Dichloroethene	25	U	25	200
trans-1,3-Dichloropropene	35	U	35	200
Trichlorofluoromethane	48	U	48	200
Vinyl chloride	60	U	60	200
Surrogate	% Rec	Acceptance Limits		
4-Bromofluorobenzene	112	65 - 124		
Dibromofluoromethane	100	65 - 124		
Toluene-d8 (Surr)	104	65 - 132		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-165027

Method: 8260B

Preparation: N/A

LCS Lab Sample ID: LCS 680-165027/8
 Client Matrix: Solid
 Dilution: 40
 Date Analyzed: 04/06/2010 1045
 Date Prepared: N/A

Analysis Batch: 680-165027
 Prep Batch: N/A
 Units: ug/Kg

Instrument ID: MSM
 Lab File ID: mq088.d
 Initial Weight/Volume: 5 g
 Final Weight/Volume: 5 mL

LCSD Lab Sample ID: LCSD 680-165027/9
 Client Matrix: Solid
 Dilution: 40
 Date Analyzed: 04/06/2010 1108
 Date Prepared: N/A

Analysis Batch: 680-165027
 Prep Batch: N/A
 Units: ug/Kg

Instrument ID: MSM
 Lab File ID: mq089.d
 Initial Weight/Volume: 5 g
 Final Weight/Volume: 5 mL

Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	82	81	72 - 124	1	50		
1,1,1-Trichloroethane	93	89	56 - 140	4	50		
1,1,2,2-Tetrachloroethane	108	106	65 - 130	3	50		
1,1,2-Trichloroethane	95	95	62 - 138	0	50		
1,1-Dichloroethane	98	99	65 - 130	1	50		
1,1-Dichloroethene	91	98	59 - 137	8	50		
1,1-Dichloropropene	95	96	55 - 141	1	50		
1,2,3-Trichlorobenzene	80	81	72 - 132	1	50		
1,2,3-Trichloropropane	102	101	65 - 132	0	50		
1,2,4-Trichlorobenzene	81	83	74 - 130	3	50		
1,2,4-Trimethylbenzene	85	86	68 - 130	1	50		
1,2-Dichloroethane	92	90	62 - 140	2	50		
1,2-Dichlorobenzene	94	98	75 - 123	4	50		
1,2-Dibromo-3-Chloropropane	91	91	62 - 140	0	50		
1,2-Dichloropropane	98	94	66 - 135	4	50		
Ethylene Dibromide	100	96	61 - 138	3	50		
1,3,5-Trimethylbenzene	84	87	67 - 131	4	50		
1,3-Dichlorobenzene	95	97	74 - 123	2	50		
1,3-Dichloropropane	97	94	60 - 137	4	50		
1,4-Dichlorobenzene	96	97	75 - 122	1	50		
2,2-Dichloropropane	93	96	59 - 138	3	50		
2-Chlorotoluene	92	93	73 - 123	2	50		
4-Chlorotoluene	93	95	75 - 123	2	50		
Acetone	134	137	16 - 202	2	50		
Benzene	97	96	63 - 130	0	50		
Bromobenzene	80	82	73 - 123	2	50		
Chlorobromomethane	97	97	12 - 159	0	50		
Dichlorobromomethane	104	104	64 - 137	0	50		
Bromoform	90	88	66 - 127	2	50		
Bromomethane	80	86	54 - 146	8	50		
Carbon tetrachloride	86	86	60 - 136	1	50		
Chlorobenzene	83	83	77 - 120	0	50		
Chloroethane	42	39	26 - 166	6	50		M

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-165027

Method: 8260B

Preparation: N/A

LCS Lab Sample ID:	LCS 680-165027/8	Analysis Batch:	680-165027	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq088.d
Dilution:	40	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/06/2010 1045			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

LCSD Lab Sample ID:	LCSD 680-165027/9	Analysis Batch:	680-165027	Instrument ID:	MSM
Client Matrix:	Solid	Prep Batch:	N/A	Lab File ID:	mq089.d
Dilution:	40	Units:	ug/Kg	Initial Weight/Volume:	5 g
Date Analyzed:	04/06/2010 1108			Final Weight/Volume:	5 mL
Date Prepared:	N/A				

Analyte	% Rec.		RPD	RPD Limit	LCS Qual	LCSD Qual
	LCS	LCSD				
Chloroform	88	90	68 - 127	2	50	
Chloromethane	119	121	46 - 137	2	50	
cis-1,2-Dichloroethene	98	94	58 - 143	3	50	
cis-1,3-Dichloropropene	94	92	66 - 137	2	50	
Chlorodibromomethane	85	85	70 - 126	1	50	
Dichlorodifluoromethane	75	76	17 - 163	1	50	
Ethylbenzene	85	85	77 - 121	0	50	
Hexachlorobutadiene	80	81	66 - 134	2	50	
Isopropylbenzene	85	86	74 - 124	2	50	
Methylene Chloride	106	102	65 - 126	3	50	
Methyl tert-butyl ether	112	112	68 - 128	0	50	
2-Butanone (MEK)	136	132	19 - 192	3	50	
4-Methyl-2-pentanone (MIBK)	115	110	50 - 148	5	50	
n-Butylbenzene	87	90	66 - 130	3	50	
N-Propylbenzene	94	97	74 - 124	3	50	
m-Xylene & p-Xylene	85	88	76 - 122	3	50	
Naphthalene	84	86	63 - 144	2	50	
o-Xylene	81	84	76 - 122	4	50	
4-Isopropyltoluene	86	86	62 - 134	1	50	
sec-Butylbenzene	85	87	74 - 125	2	50	
Styrene	98	98	75 - 123	1	50	
Trichloroethene	90	88	68 - 133	2	50	
tert-Butylbenzene	84	86	75 - 123	2	50	
Tetrachloroethene	80	84	76 - 120	5	50	
Toluene	97	97	67 - 132	0	50	
trans-1,2-Dichloroethene	96	94	66 - 127	1	50	
trans-1,3-Dichloropropene	108	108	64 - 138	0	50	
Trichlorofluoromethane	84	86	33 - 152	2	50	
Vinyl chloride	100	102	56 - 139	2	50	
Surrogate	LCS % Rec		LCSD % Rec		Acceptance Limits	
4-Bromofluorobenzene	96		97		65 - 124	
Dibromofluoromethane	88		88		65 - 124	

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	93	92	65 - 132

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165124**Method: 8260B****Preparation: 5030B**

Lab Sample ID: MB 680-165124/8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/07/2010 1657
Date Prepared: 04/07/2010 1657

Analysis Batch: 680-165124
Prep Batch: N/A
Units: ug/L

Instrument ID: MSA
Lab File ID: aq059.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.25	U	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	5.0	U	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.16	U	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	0.25	U	0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	0.14	U	0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	0.10	U	0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.11	U	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.10	U	0.10	1.0

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165124**Method: 8260B****Preparation: 5030B**

Lab Sample ID: MB 680-165124/8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/07/2010 1657
Date Prepared: 04/07/2010 1657

Analysis Batch: 680-165124
Prep Batch: N/A
Units: ug/L

Instrument ID: MSA
Lab File ID: aq059.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.0	U	1.0	10
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.10	U	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.20	U	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.13	U	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.11	U	0.11	1.0
Trichloroethene	0.13	U	0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	0.15	U	0.15	1.0
Toluene	0.33	U	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	% Rec	Acceptance Limits		
4-Bromofluorobenzene	97	75 - 120		
Dibromofluoromethane	101	75 - 121		
Toluene-d8 (Surr)	98	75 - 120		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/**Lab Control Sample Duplicate Recovery Report - Batch: 680-165124****Method: 8260B****Preparation: 5030B**

LCS Lab Sample ID:	LCS 680-165124/5	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq051.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 1502			Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 1502				
LCSD Lab Sample ID:	LCSD 680-165124/6	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq053.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 1531			Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 1531				

Analyte	LCS	LCSD	% Rec.	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	91	92	81 - 128	1	30			
1,1,1-Trichloroethane	103	104	76 - 127	1	30			
1,1,2,2-Tetrachloroethane	100	103	69 - 129	4	30			
1,1,2-Trichloroethane	96	100	75 - 121	3	30			
1,1-Dichloroethane	99	100	74 - 127	1	30			
1,1-Dichloroethene	109	109	62 - 141	0	30			
1,1-Dichloropropene	108	108	77 - 122	0	30			
1,2,3-Trichlorobenzene	107	110	60 - 132	2	30			
1,2,3-Trichloropropane	103	106	70 - 130	3	30			
1,2,4-Trichlorobenzene	104	109	60 - 135	5	30			
1,2,4-Trimethylbenzene	110	112	72 - 132	2	30			
1,2-Dichloroethane	97	96	66 - 132	1	30			
1,2-Dichlorobenzene	108	110	79 - 124	1	30			
1,2-Dibromo-3-Chloropropane	89	91	49 - 140	1	30			
1,2-Dichloropropane	104	105	73 - 124	1	30			
Ethylene Dibromide	98	100	80 - 121	2	30			
1,3,5-Trimethylbenzene	108	110	72 - 133	2	30			
1,3-Dichlorobenzene	106	107	78 - 125	1	30			
1,3-Dichloropropane	101	103	75 - 120	1	30			
1,4-Dichlorobenzene	106	107	81 - 122	2	30			
2,2-Dichloropropane	106	104	55 - 157	1	30			
2-Chlorotoluene	107	109	82 - 123	1	30			
4-Chlorotoluene	110	112	83 - 122	2	30			
Acetone	129	108	17 - 175	18	50			
Benzene	102	103	77 - 119	0	30			
Bromobenzene	106	106	80 - 124	0	30			
Chlorobromomethane	103	105	10 - 150	2	30			
Dichlorobromomethane	104	104	78 - 127	1	30			
Bromoform	97	101	62 - 133	3	30			
Bromomethane	73	72	12 - 184	2	50			
Carbon tetrachloride	94	94	71 - 135	1	30			
Chlorobenzene	99	101	85 - 116	1	30			
Chloroethane	109	98	40 - 165	10	50			

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-165124

Method: 8260B

Preparation: 5030B

LCS Lab Sample ID:	LCS 680-165124/5	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq051.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 1502			Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 1502				

LCSD Lab Sample ID:	LCSD 680-165124/6	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq053.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 1531			Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 1531				

Analyte	% Rec.						
	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
Chloroform	99	101	82 - 120	1	30		
Chloromethane	109	86	48 - 142	24	50		
cis-1,2-Dichloroethene	99	100	69 - 134	1	30		
cis-1,3-Dichloropropene	110	110	76 - 126	0	30		
Chlorodibromomethane	85	87	75 - 133	2	30		
Dichlorodifluoromethane	132	129	34 - 154	2	30		
Ethylbenzene	105	106	86 - 116	1	30		
Hexachlorobutadiene	110	114	62 - 142	4	30		
Isopropylbenzene	108	110	82 - 121	1	30		
Methylene Chloride	112	107	70 - 125	4	30		
Methyl tert-butyl ether	112	115	77 - 121	2	30		
2-Butanone (MEK)	101	105	33 - 157	3	30		
4-Methyl-2-pentanone (MIBK)	102	104	40 - 151	2	30		
n-Butylbenzene	112	113	64 - 136	1	30		
N-Propylbenzene	111	114	80 - 126	2	30		
m-Xylene & p-Xylene	104	105	83 - 118	1	30		
Naphthalene	109	113	48 - 135	4	30		
o-Xylene	105	108	83 - 119	3	30		
4-Isopropyltoluene	110	113	63 - 139	2	30		
sec-Butylbenzene	109	112	77 - 126	2	30		
Styrene	105	107	82 - 122	2	30		
Trichloroethene	99	99	84 - 115	0	30		
tert-Butylbenzene	111	113	80 - 124	2	30		
Tetrachloroethene	99	101	76 - 126	2	30		
Toluene	103	104	81 - 117	1	30		
trans-1,2-Dichloroethene	101	100	72 - 131	0	30		
trans-1,3-Dichloropropene	112	113	73 - 128	1	30		
Trichlorofluoromethane	110	110	58 - 149	0	50		
Vinyl chloride	101	78	59 - 144	26	50		
Surrogate		LCS % Rec	LCSD % Rec		Acceptance Limits		
4-Bromofluorobenzene		100	101		75 - 120		
Dibromofluoromethane		97	99		75 - 121		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	98	98	75 - 120

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

**Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-165124**

**Method: 8260B
Preparation: 5030B**

MS Lab Sample ID:	680-56230-16	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	a065.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Date Analyzed:	04/08/2010 0056			Final Weight/Volume:	5 mL
Date Prepared:	04/08/2010 0056				

MSD Lab Sample ID:	680-56230-16	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	a067.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Date Analyzed:	04/08/2010 0125			Final Weight/Volume:	5 mL
Date Prepared:	04/08/2010 0125				

Analyte	% Rec.		Limit	RPD	RPD Limit	MS Qual	MSD Qual
	MS	MSD					
1,1,1,2-Tetrachloroethane	88	75	81 - 128	16	30		J
1,1,1-Trichloroethane	99	85	76 - 127	15	30		
1,1,2,2-Tetrachloroethane	97	83	69 - 129	16	30		
1,1,2-Trichloroethane	91	78	75 - 121	15	30		
1,1-Dichloroethane	97	83	74 - 127	16	30		
1,1-Dichloroethene	111	103	62 - 141	8	30		
1,1-Dichloropropene	105	91	77 - 122	13	30		
1,2,3-Trichlorobenzene	95	83	60 - 132	13	30		
1,2,3-Trichloropropane	99	84	70 - 130	17	30		
1,2,4-Trichlorobenzene	92	83	60 - 135	11	30		
1,2,4-Trimethylbenzene	108	95	72 - 132	13	30		
1,2-Dichloroethane	92	79	66 - 132	15	30		
1,2-Dichlorobenzene	102	89	79 - 124	13	30		
1,2-Dibromo-3-Chloropropane	76	65	49 - 140	16	30		
1,2-Dichloropropane	100	85	73 - 124	17	30		
Ethylene Dibromide	92	78	80 - 121	16	30		J
1,3,5-Trimethylbenzene	106	92	72 - 133	14	30		
1,3-Dichlorobenzene	102	89	78 - 125	13	30		
1,3-Dichloropropane	97	82	75 - 120	16	30		
1,4-Dichlorobenzene	101	89	81 - 122	12	30		
2,2-Dichloropropane	84	72	55 - 157	15	30		
2-Chlorotoluene	106	92	82 - 123	14	30		
4-Chlorotoluene	109	95	83 - 122	14	30		
Acetone	107	92	17 - 175	15	50		
Benzene	100	87	77 - 119	14	30		
Bromobenzene	105	90	80 - 124	16	30		
Chlorobromomethane	98	84	10 - 150	16	30		
Dichlorobromomethane	97	83	78 - 127	16	30		
Bromoform	87	75	62 - 133	14	30		
Bromomethane	112	99	12 - 184	12	50		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

**Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-165124**

**Method: 8260B
Preparation: 5030B**

MS Lab Sample ID:	680-56230-16	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	a065.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Date Analyzed:	04/08/2010 0056			Final Weight/Volume:	5 mL
Date Prepared:	04/08/2010 0056				

MSD Lab Sample ID:	680-56230-16	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	a067.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Date Analyzed:	04/08/2010 0125			Final Weight/Volume:	5 mL
Date Prepared:	04/08/2010 0125				

Analyte	% Rec.		Limit	RPD	RPD Limit	MS Qual	MSD Qual
	MS	MSD					
Carbon tetrachloride	88	79	71 - 135	11	30		
Chlorobenzene	100	87	85 - 116	15	30		
Chloroethane	112	111	40 - 165	1	50		
Chloroform	96	83	82 - 120	14	30		
Chloromethane	111	94	48 - 142	16	50		
cis-1,2-Dichloroethene	95	82	69 - 134	15	30		
cis-1,3-Dichloropropene	98	85	76 - 126	13	30		
Chlorodibromomethane	79	69	75 - 133	13	30		J
Dichlorodifluoromethane	127	109	34 - 154	15	30		
Ethylbenzene	107	93	86 - 116	13	30		
Hexachlorobutadiene	96	92	62 - 142	5	30		
Isopropylbenzene	110	96	82 - 121	13	30		
Methylene Chloride	99	95	70 - 125	4	30		
Methyl tert-butyl ether	103	89	77 - 121	15	30		
2-Butanone (MEK)	88	73	33 - 157	18	30		
4-Methyl-2-pentanone (MIBK)	92	76	40 - 151	19	30		
n-Butylbenzene	107	94	64 - 136	13	30		
N-Propylbenzene	110	97	80 - 126	13	30		
m-Xylene & p-Xylene	105	92	83 - 118	13	30		
Naphthalene	96	84	48 - 135	14	30		
o-Xylene	106	92	83 - 119	14	30		
4-Isopropyltoluene	108	95	63 - 139	13	30		
sec-Butylbenzene	107	94	77 - 126	13	30		
Styrene	105	91	82 - 122	14	30		
Trichloroethene	95	84	84 - 115	13	30		
tert-Butylbenzene	110	96	80 - 124	13	30		
Tetrachloroethene	98	87	76 - 126	11	30		
Toluene	100	87	81 - 117	13	30		
trans-1,2-Dichloroethene	98	85	72 - 131	14	30		
trans-1,3-Dichloropropene	100	86	73 - 128	15	30		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

**Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 680-165124**

**Method: 8260B
Preparation: 5030B**

MS Lab Sample ID:	680-56230-16	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	a065.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Date Analyzed:	04/08/2010 0056			Final Weight/Volume:	5 mL
Date Prepared:	04/08/2010 0056				
MSD Lab Sample ID:	680-56230-16	Analysis Batch:	680-165124	Instrument ID:	MSA
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	a067.d
Dilution:	1.0			Initial Weight/Volume:	5 mL
Date Analyzed:	04/08/2010 0125			Final Weight/Volume:	5 mL
Date Prepared:	04/08/2010 0125				

Analyte	% Rec.		Limit	RPD	RPD Limit	MS Qual	MSD Qual
	MS	MSD					
Trichlorofluoromethane	112	98	58 - 149	14	50		
Vinyl chloride	111	84	59 - 144	28	50		
Surrogate		MS % Rec	MSD % Rec		Acceptance Limits		
4-Bromofluorobenzene		99		86		75 - 120	
Dibromofluoromethane		93		81		75 - 121	
Toluene-d8 (Surr)		96		83		75 - 120	

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165125**Method: 8260B****Preparation: 5030B**

Lab Sample ID: MB 680-165125/8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/07/2010 1712
Date Prepared: 04/07/2010 1712

Analysis Batch: 680-165125
Prep Batch: N/A
Units: ug/L

Instrument ID: MSA2
Lab File ID: aq060.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
1,1,1,2-Tetrachloroethane	0.33	U	0.33	1.0
1,1,1-Trichloroethane	0.50	U	0.50	1.0
1,1,2,2-Tetrachloroethane	0.18	U	0.18	1.0
1,1,2-Trichloroethane	0.13	U	0.13	1.0
1,1-Dichloroethane	0.25	U	0.25	1.0
1,1-Dichloroethene	0.11	U	0.11	1.0
1,1-Dichloropropene	0.25	U	0.25	1.0
1,2,3-Trichlorobenzene	0.35	U	0.35	1.0
1,2,3-Trichloropropane	0.41	U	0.41	1.0
1,2,4-Trichlorobenzene	0.257	J	0.25	1.0
1,2,4-Trimethylbenzene	0.33	U	0.33	1.0
1,2-Dichloroethane	0.10	U	0.10	1.0
1,2-Dichlorobenzene	0.21	U	0.21	1.0
1,2-Dibromo-3-Chloropropane	0.44	U	0.44	1.0
1,2-Dichloropropane	0.13	U	0.13	1.0
Ethylene Dibromide	0.25	U	0.25	1.0
1,3,5-Trimethylbenzene	0.33	U	0.33	1.0
1,3-Dichlorobenzene	0.25	U	0.25	1.0
1,3-Dichloropropane	0.13	U	0.13	1.0
1,4-Dichlorobenzene	0.28	U	0.28	1.0
1-Chlorohexane	0.27	U	0.27	1.0
2,2-Dichloropropane	0.12	U	0.12	1.0
2-Chlorotoluene	0.17	U	0.17	1.0
4-Chlorotoluene	0.27	U	0.27	1.0
Acetone	5.0	U	5.0	25
Benzene	0.25	U	0.25	1.0
Bromobenzene	0.16	U	0.16	1.0
Chlorobromomethane	0.14	U	0.14	1.0
Dichlorobromomethane	0.25	U	0.25	1.0
Bromoform	0.50	U	0.50	1.0
Bromomethane	0.80	U	0.80	1.0
Carbon tetrachloride	0.50	U	0.50	1.0
Chlorobenzene	0.25	U	0.25	1.0
Chloroethane	1.0	U	1.0	1.0
Chloroform	0.14	U	0.14	1.0
Chloromethane	0.33	U	0.33	1.0
cis-1,2-Dichloroethene	0.15	U	0.15	1.0
cis-1,3-Dichloropropene	0.11	U	0.11	1.0
Chlorodibromomethane	0.10	U	0.10	1.0
Dichlorodifluoromethane	0.25	U	0.25	1.0
Ethylbenzene	0.11	U	0.11	1.0
Hexachlorobutadiene	0.40	U	0.40	1.0
Isopropylbenzene	0.10	U	0.10	1.0

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Method Blank - Batch: 680-165125**Method: 8260B****Preparation: 5030B**

Lab Sample ID: MB 680-165125/8
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 04/07/2010 1712
Date Prepared: 04/07/2010 1712

Analysis Batch: 680-165125
Prep Batch: N/A
Units: ug/L

Instrument ID: MSA2
Lab File ID: aq060.d
Initial Weight/Volume: 5 mL
Final Weight/Volume: 5 mL

Analyte	Result	Qual	MDL	RL
Methylene Chloride	1.0	U	1.0	5.0
Methyl tert-butyl ether	0.20	U	0.20	10
2-Butanone (MEK)	1.0	U	1.0	10
4-Methyl-2-pentanone (MIBK)	1.0	U	1.0	10
n-Butylbenzene	0.10	U	0.10	1.0
N-Propylbenzene	0.15	U	0.15	1.0
m-Xylene & p-Xylene	0.20	U	0.20	2.0
Naphthalene	1.0	U	1.0	5.0
o-Xylene	0.25	U	0.25	1.0
4-Isopropyltoluene	0.13	U	0.13	1.0
sec-Butylbenzene	0.16	U	0.16	1.0
Styrene	0.11	U	0.11	1.0
Trichloroethene	0.13	U	0.13	1.0
tert-Butylbenzene	0.12	U	0.12	1.0
Tetrachloroethene	0.15	U	0.15	1.0
Toluene	0.33	U	0.33	1.0
trans-1,2-Dichloroethene	0.20	U	0.20	1.0
trans-1,3-Dichloropropene	0.21	U	0.21	1.0
Trichlorofluoromethane	0.25	U	0.25	1.0
Vinyl chloride	0.18	U	0.18	1.0
Surrogate	% Rec	Acceptance Limits		
4-Bromofluorobenzene	90	75 - 120		
Dibromofluoromethane	102	75 - 121		
Toluene-d8 (Surr)	94	75 - 120		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-165125

Method: 8260B

Preparation: 5030B

LCS Lab Sample ID:	LCS 680-165125/5	Analysis Batch:	680-165125	Instrument ID:	MSA2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq052.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 1516			Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 1516				
LCSD Lab Sample ID:	LCSD 680-165125/6	Analysis Batch:	680-165125	Instrument ID:	MSA2
Client Matrix:	Water	Prep Batch:	N/A	Lab File ID:	aq054.d
Dilution:	1.0	Units:	ug/L	Initial Weight/Volume:	5 mL
Date Analyzed:	04/07/2010 1545			Final Weight/Volume:	5 mL
Date Prepared:	04/07/2010 1545				

Analyte	LCS	LCSD	% Rec.	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
1,1,1,2-Tetrachloroethane	89	90	81 - 128	1	30			
1,1,1-Trichloroethane	99	101	76 - 127	1	30			
1,1,2,2-Tetrachloroethane	103	102	69 - 129	1	30			
1,1,2-Trichloroethane	99	98	75 - 121	1	30			
1,1-Dichloroethane	97	100	74 - 127	3	30			
1,1-Dichloroethene	101	100	62 - 141	1	30			
1,1-Dichloropropene	107	107	77 - 122	0	30			
1,2,3-Trichlorobenzene	108	108	60 - 132	0	30			
1,2,3-Trichloropropane	110	110	70 - 130	0	30			
1,2,4-Trichlorobenzene	105	106	60 - 135	0	30			
1,2,4-Trimethylbenzene	99	99	72 - 132	0	30			
1,2-Dichloroethane	97	96	66 - 132	2	30			
1,2-Dichlorobenzene	106	107	79 - 124	1	30			
1,2-Dibromo-3-Chloropropane	89	90	49 - 140	1	30			
1,2-Dichloropropane	102	104	73 - 124	1	30			
Ethylene Dibromide	99	98	80 - 121	1	30			
1,3,5-Trimethylbenzene	97	97	72 - 133	0	30			
1,3-Dichlorobenzene	105	106	78 - 125	1	30			
1,3-Dichloropropane	103	104	75 - 120	1	30			
1,4-Dichlorobenzene	102	103	81 - 122	1	30			
2,2-Dichloropropane	105	104	55 - 157	1	30			
2-Chlorotoluene	101	102	82 - 123	1	30			
4-Chlorotoluene	106	109	83 - 122	3	30			
Acetone	102	109	17 - 175	7	50			
Benzene	104	104	77 - 119	1	30			
Bromobenzene	104	104	80 - 124	0	30			
Chlorobromomethane	101	102	10 - 150	1	30			
Dichlorobromomethane	100	100	78 - 127	0	30			
Bromoform	100	98	62 - 133	2	30			
Bromomethane	95	113	12 - 184	17	50			
Carbon tetrachloride	95	96	71 - 135	2	30			
Chlorobenzene	98	99	85 - 116	0	30			
Chloroethane	122	113	40 - 165	7	50			

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Lab Control Sample/

Lab Control Sample Duplicate Recovery Report - Batch: 680-165125

Method: 8260B

Preparation: 5030B

LCS Lab Sample ID: LCS 680-165125/5
 Client Matrix: Water
 Dilution: 1.0
 Date Analyzed: 04/07/2010 1516
 Date Prepared: 04/07/2010 1516

Analysis Batch: 680-165125
 Prep Batch: N/A
 Units: ug/L

Instrument ID: MSA2
 Lab File ID: aq052.d
 Initial Weight/Volume: 5 mL
 Final Weight/Volume: 5 mL

LCSD Lab Sample ID: LCSD 680-165125/6
 Client Matrix: Water
 Dilution: 1.0
 Date Analyzed: 04/07/2010 1545
 Date Prepared: 04/07/2010 1545

Analysis Batch: 680-165125
 Prep Batch: N/A
 Units: ug/L

Instrument ID: MSA2
 Lab File ID: aq054.d
 Initial Weight/Volume: 5 mL
 Final Weight/Volume: 5 mL

Analyte	LCS	LCSD	Limit	RPD	RPD Limit	LCS Qual	LCSD Qual	% Rec.
Chloroform	100	99	82 - 120	0	30			
Chloromethane	98	103	48 - 142	5	50			
cis-1,2-Dichloroethene	98	99	69 - 134	1	30			
cis-1,3-Dichloropropene	109	109	76 - 126	1	30			
Chlorodibromomethane	86	86	75 - 133	0	30			
Dichlorodifluoromethane	118	119	34 - 154	1	30			
Ethylbenzene	106	106	86 - 116	0	30			
Hexachlorobutadiene	114	113	62 - 142	0	30			
Isopropylbenzene	99	102	82 - 121	3	30			
Methylene Chloride	117	117	70 - 125	0	30			
Methyl tert-butyl ether	119	121	77 - 121	2	30			
2-Butanone (MEK)	107	105	33 - 157	2	30			
4-Methyl-2-pentanone (MIBK)	106	105	40 - 151	1	30			
n-Butylbenzene	111	111	64 - 136	0	30			
N-Propylbenzene	109	111	80 - 126	2	30			
m-Xylene & p-Xylene	101	101	83 - 118	0	30			
Naphthalene	111	111	48 - 135	0	30			
o-Xylene	104	103	83 - 119	1	30			
4-Isopropyltoluene	100	101	63 - 139	1	30			
sec-Butylbenzene	98	100	77 - 126	2	30			
Styrene	104	104	82 - 122	0	30			
Trichloroethene	100	100	84 - 115	0	30			
tert-Butylbenzene	113	114	80 - 124	1	30			
Tetrachloroethene	99	102	76 - 126	3	30			
Toluene	102	103	81 - 117	0	30			
trans-1,2-Dichloroethene	105	106	72 - 131	1	30			
trans-1,3-Dichloropropene	98	99	73 - 128	1	30			
Trichlorofluoromethane	108	113	58 - 149	4	50			
Vinyl chloride	101	99	59 - 144	2	50			
Surrogate		LCS % Rec	LCSD % Rec			Acceptance Limits		
4-Bromofluorobenzene	96		96			75 - 120		
Dibromofluoromethane	96		98			75 - 121		

Quality Control Results

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Surrogate	LCS % Rec	LCSD % Rec	Acceptance Limits
Toluene-d8 (Surr)	94	94	75 - 120

TestAmerica

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD
TestAmerica Savannah

Website: www.testamericainc.com

Phone: (912) 354-7858

Fax: (912) 352-0165

5102 LaRocie Avenue

Savannah, GA 31404

 Alternate Laboratory Name/Location

THE LEADER IN ENVIRONMENTAL TESTING

 Phone: _____
 Fax: _____

PROJECT REFERENCE
Former Duluth Dry Cleaning Site

TAL (LAB) PROJECT MANAGER

PROJECT NO.

PAGE

OF

Z

STANDARD REPORT

DATE DUE

O

EXPEDITED REPORT

DATE DUE

(SURCHARGE)

O

NUMBER OF COOLERS SUBMITTED

DATE DUE

O

PER SHIPMENT

O

REMARKS

**PROJECT LOCATION
(STATE)**
CONTRACT NO.
MATRIX TYPE
REQUIRED ANALYSIS
P.O. NUMBER
CLIENT FAX
NONAQUEOUS LIQUID (OIL, SOLVENT, ETC.)
STANDARD REPORT
DATE DUE

O

CLIENT PHONE
CLIENT E-MAIL
AQUEOUS (WATER)
EXPEDITED REPORT
DATE DUE

O

CLIENT NAME
SOLID OR SEMISOLID
NUMBER OF COOLERS SUBMITTED

O

COMPON SITE (G) OR GRAB (G) INDICATE
NUMBER OF CONTAINERS SUBMITTED

O

CLIENT ADDRESS
NUMBER OF COOLERS SUBMITTED

O

COMPANY CONTRACTING THIS WORK (if applicable)
NUMBER OF COOLERS SUBMITTED

O

REMARKS
SAMPLE
SAMPLE IDENTIFICATION
DATE
TIME
REINQUISITION BY:
(SIGNATURE)

DATE

TIME

REINQUISITION BY: (SIGNATURE)

DATE

TIME

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYSIS REQUEST AND CHAIN OF CUSTODY RECORD



5102 LaRochte Avenue
Savannah, GA 31404

Alternate Laboratory Name/Location

Phone:
Fax:

Website: www.testamericanainc.com
Phone: (912) 354-7858
Fax: (912) 352-0165

Serial Number

028128

Project Reference Front Bulk Dry Cleaning Site						Project Location (State) GA						Matrix Type																																																															
TAL (LAB) Project Manager Kevin Haberlin						P.O. Number 912-652-6083						Contract No. CLIENT FAX																																																															
Client Name USACE						Client Phone CLIENT E-MAIL						AIR SOLID OR SEMI-SOLID																																																															
Client Address 100 W. Oglethorpe Ave. Savannah GA 31401						AQUEOUS (WATER) SOLVENT (G) OR GRAVE (G) INDICATE						NONAQUEOUS LIQUID (OIL, SOLVENT, ...)																																																															
Company Contracting This Work (if applicable) 						CONTAINERS SUBMITTED						COOLERS SUBMITTED PER SHIPMENT:																																																															
SAMPLE IDENTIFICATION												NUMBER OF CONTAINERS SUBMITTED																																																															
SAMPLE		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME		DATE		TIME							
Page <u>3</u> of <u>10</u>		<u>1440</u>		<u>DP-4</u>		<u>3/26/10</u>		<u>5B-3-10</u>		<u>4</u>		<u>3</u>		<u>3/27/10</u>		<u>5B-3-35</u>		<u>4</u>		<u>3</u>		<u>3/27/10</u>		<u>D-3</u>		<u>9</u>		<u>3/27/10</u>		<u>BLK 2</u>		<u>2</u>		<u>3/27/10</u>		<u>BLANK</u>		<u>-</u>		<u>3/27/10</u>		<u>BLANK</u>		<u>-</u>		<u>3/27/10</u>		<u>BLANK</u>		<u>-</u>		<u>3/27/10</u>		<u>BLANK</u>		<u>-</u>		<u>3/27/10</u>		<u>BLANK</u>		<u>-</u>		<u>3/27/10</u>		<u>BLANK</u>		<u>-</u>		<u>3/27/10</u>		<u>BLANK</u>		<u>-</u>	
RELINQUISHED BY: <u>John P. White</u>		DATE <u>3/27/10</u>		TIME <u>1040</u>		RELINQUISHED BY: <u>(Signature)</u>										RECEIVED BY: <u>John P. White</u>		DATE <u>3/27/10</u>		TIME <u>1040</u>		CUSTODY INTACT <input checked="" type="radio"/> YES <input type="radio"/> NO		CUSTODY SEAL <input checked="" type="radio"/> LOG NO. <input type="radio"/> NO		LABORATORY USE ONLY <u>SAVANNAH LOG NO.</u> <u>680-56230</u>		RELABORATORY REMARKS																																															
RECEIVED FOR LABORATORY BY: <u>John P. White</u>		DATE <u>3/27/10</u>		TIME <u>1040</u>		RECEIVED BY: <u>(Signature)</u>										LABORATORY USE ONLY <u>SAVANNAH LOG NO.</u> <u>680-56230</u>		RELABORATORY REMARKS																																																									

Login Sample Receipt Check List

Client: U.S. Army Corps of Engineers

Job Number: 680-56230-1

Login Number: 56230

List Source: TestAmerica Savannah

Creator: Conner, Keaton

List Number: 1

Question	T / F / NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	N/A	-6 LABELS READ DUP1/-10 LABELS READ DUP2/-7 LABELS READ SB-2-41
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	True	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Is the Field Sampler's name present on COC?	True	
Sample Preservation Verified	True	

APPENDIX D

VAPOR INTRUSION MODELING



TARGET MEDIA CONCENTRATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: Former Duluth Drycleaner Site

Report Date: Thu Jun 17 12:34:05 EDT 2010

Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm

Depth to contamination from bottom of foundation: 40ft +/- 10ft

Average ground water temperature: 17C

CHEMICAL PROPERTIES

Chemical of Concern: cis-1,2-Dichloroethylene CAS Number: 156592

Molecular Weight: 96.94[g/mole] Henrys Constant: 0.119669[unitless]

Diffusivity in Air: 7.360e-2[cm²/sec] Diffusivity in Water: 1.130e-5[cm²/sec]

Unit Risk Factor: 0[($\mu\text{g}/\text{m}^3$)⁻¹] Reference Concentration: 0.035[mg/m³]

SOIL PROPERTIES

Soil Type: Loam Total Porosity: 0.399

Unsaturated Zone Moisture Content:

low= 0.061 best estimate= 0.148 high= 0.24

Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]

Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES

Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr⁻¹]

Building Mixing Height: 2.44[m] Building Footprint Area: 100[m²]

Subsurface Foundation Area: 106[m²] Building Crack Ratio: 0.00038[unitless]

Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS

Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]

Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]

Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS

Effective Diffusion Coefficients:

Unsaturated Zone(D_{eff}): 0.004634[cm²/s]

Unsaturated Zone + Capillary Zone (D^T_{eff}): 0.001572[cm²/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0002268

Ground Water Attenuation Factor (α_{GW}): 0.00007938

Target Concentrations are based on NON-CANCER risk.

Target Indoor Air Concentration: 35[$\mu\text{g}/\text{m}^3$] or 8.833[ppbv]

¹Less Protective Target Concentrations

Soil Gas: 8.446e5[$\mu\text{g}/\text{m}^3$] or 2.132e5[ppbv]; Ground Water: 9319.[$\mu\text{g}/\text{L}$]

²Best Estimate Target Concentrations

Soil Gas: 1.543e5[$\mu\text{g}/\text{m}^3$] or 3.895e4[ppbv]; Ground Water: 3684.[$\mu\text{g}/\text{L}$]

²More Protective Target Concentrations

Soil Gas: 4.811e4[$\mu\text{g}/\text{m}^3$] or 1.214e4[ppbv]; Ground Water: 2821.[$\mu\text{g}/\text{L}$]

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for soil-gas to indoor-air pathway. Diffusion through soil is the overall rate-limiting process for groundwater to indoor-air pathway.

¹"Less Protective" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

²"More Protective" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.

TARGET MEDIA CONCENTRATION RESULTS



Screening-Level Johnson and Ettinger Model

Site Name: Former Duluth Drycleaner Site
Report Date: Thu Jun 17 12:35:12 EDT 2010
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm
Depth to contamination from bottom of foundation: 40ft +/- 10ft
Average ground water temperature: 17C

CHEMICAL PROPERTIES

Chemical of Concern: Ethylbenzene CAS Number: 100414
Molecular Weight: 106.17[g/mole] Henrys Constant: 0.2065914[unitless]
Diffusivity in Air: 7.500e-2[cm²/sec] Diffusivity in Water: 7.800e-6[cm²/sec]
Unit Risk Factor: 0.0000011[(μ g/m³)⁻¹] Reference Concentration: 1[mg/m³]

SOIL PROPERTIES

Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES

Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr⁻¹]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m²]
Subsurface Foundation Area: 106[m²] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS

Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]
Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS

Effective Diffusion Coefficients:

Unsaturated Zone(D_{eff}): 0.004721[cm²/s]
Unsaturated Zone + Capillary Zone (D_{eff}^T): 0.00146[cm²/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0002309
Ground Water Attenuation Factor (α_{GW}): 0.00007377
Target Concentrations are based on CANCER risk.
Target Indoor Air Concentration: 2.212[μ g/m³] or 0.5098[ppbv]

¹Less Protective Target Concentrations

Soil Gas: 5.256e4[μ g/m³] or 1.211e4[ppbv]; Ground Water: 348.3[μ g/L]

²Best Estimate Target Concentrations

Soil Gas: 9581.[μ g/m³] or 2208.[ppbv]; Ground Water: 145.2[μ g/L]

²More Protective Target Concentrations

Soil Gas: 2992.[μ g/m³] or 689.5[ppbv]; Ground Water: 114.1[μ g/L]

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for soil-gas to indoor-air pathway. Diffusion through soil is the overall rate-limiting process for groundwater to indoor-air pathway.

¹"Less Protective" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

²"More Protective" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.

TARGET MEDIA CONCENTRATION RESULTS



Screening-Level Johnson and Ettinger Model

Site Name: Former Duluth Drycleaner Site
Report Date: Thu Jun 17 12:48:55 EDT 2010
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm
Depth to contamination from bottom of foundation: 40ft +/- 10ft
Average ground water temperature: 17C

CHEMICAL PROPERTIES

Chemical of Concern: Cumene CAS Number: 98828
Molecular Weight: 120.19[g/mole] Henrys Constant: 27.10892[unitless]
Diffusivity in Air: 6.500e-2[cm²/sec] Diffusivity in Water: 7.100e-6[cm²/sec]
Unit Risk Factor: 0[(μg/m³)⁻¹] Reference Concentration: 0.4[mg/m³]

SOIL PROPERTIES

Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES

Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr⁻¹]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m²]
Subsurface Foundation Area: 106[m²] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS

Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]
Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS

Effective Diffusion Coefficients:

Unsaturated Zone(D_{eff}): 0.004091[cm²/s]
Unsaturated Zone + Capillary Zone (D_{eff}^T): 0.00118[cm²/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0002013
Ground Water Attenuation Factor (α_{GW}): 0.0000598
Target Concentrations are based on NON-CANCER risk.
Target Indoor Air Concentration: 400[μg/m³] or 81.42[ppbv]

1 Less Protective Target Concentrations

Soil Gas: 1.097e7[μg/m³] or 2.234e6[ppbv]; Ground Water: 570.5[μg/L]

Best Estimate Target Concentrations

Soil Gas: 1.987e6[μg/m³] or 4.044e5[ppbv]; Ground Water: 246.7[μg/L]

2 More Protective Target Concentrations

Soil Gas: 6.118e5[μg/m³] or 1.245e5[ppbv]; Ground Water: 197.4[μg/L]

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for soil-gas to indoor-air pathway. Diffusion through soil is the overall rate-limiting process for groundwater to indoor-air pathway.

¹"Less Protective" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

²"More Protective" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.



TARGET MEDIA CONCENTRATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: Former Duluth Drycleaner Site

Report Date: Thu Jun 17 12:38:34 EDT 2010

Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm

Depth to contamination from bottom of foundation: 40ft +/- 10ft

Average ground water temperature: 17C

CHEMICAL PROPERTIES

Chemical of Concern: Methyl ethyl ketone (2-butanone) CAS Number: 78933

Molecular Weight: 72.11[g/mole] Henrys Constant: 0.00158931[unitless]

Diffusivity in Air: 8.080e-2[cm²/sec] Diffusivity in Water: 9.800e-6[cm²/sec]

Unit Risk Factor: 0[($\mu\text{g}/\text{m}^3$)⁻¹] Reference Concentration: 1[mg/m³]

SOIL PROPERTIES

Soil Type: Loam Total Porosity: 0.399

Unsaturated Zone Moisture Content:

low= 0.061 best estimate= 0.148 high= 0.24

Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]

Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES

Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr⁻¹]

Building Mixing Height: 2.44[m] Building Footprint Area: 100[m²]

Subsurface Foundation Area: 106[m²] Building Crack Ratio: 0.00038[unitless]

Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS

Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]

Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]

Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS

Effective Diffusion Coefficients:

Unsaturated Zone(D_{eff}): 0.005153[cm²/s]

Unsaturated Zone + Capillary Zone (D_{eff}^T): 0.004599[cm²/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0002509

Ground Water Attenuation Factor (α_{GW}): 0.0002252

Target Concentrations are based on NON-CANCER risk.

Target Indoor Air Concentration: 1000[$\mu\text{g}/\text{m}^3$] or 339.3[ppbv]

1 Less Protective Target Concentrations

Soil Gas: 1.705e7[$\mu\text{g}/\text{m}^3$] or 5.784e6[ppbv]; Ground Water: 1.083e7[$\mu\text{g}/\text{L}$]

Best Estimate Target Concentrations

Soil Gas: 3.986e6[$\mu\text{g}/\text{m}^3$] or 1.352e6[ppbv]; Ground Water: 2.795e6[$\mu\text{g}/\text{L}$]

2 More Protective Target Concentrations

Soil Gas: 1.270e6[$\mu\text{g}/\text{m}^3$] or 4.309e5[ppbv]; Ground Water: 1.132e6[$\mu\text{g}/\text{L}$]

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for soil-gas to indoor-air pathway. Diffusion through soil is the overall rate-limiting process for groundwater to indoor-air pathway.

¹"Less Protective" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

²"More Protective" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.



TARGET MEDIA CONCENTRATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: Former Duluth Drycleaner Site
Report Date: Thu Jun 17 12:41:03 EDT 2010
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm
Depth to contamination from bottom of foundation: 40ft +/- 10ft
Average ground water temperature: 17C

CHEMICAL PROPERTIES

Chemical of Concern: m-Xylene CAS Number: 108383
Molecular Weight: 106.17[g/mole] Henrys Constant: 0.1915561[unitless]
Diffusivity in Air: 7.000e-2[cm²/sec] Diffusivity in Water: 7.800e-6[cm²/sec]
Unit Risk Factor: 0[(μ g/m³)⁻¹] Reference Concentration: 7[mg/m³]

SOIL PROPERTIES

Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES

Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr⁻¹]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m²]
Subsurface Foundation Area: 106[m²] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS

Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]
Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS

Effective Diffusion Coefficients:

Unsaturated Zone(D_{eff}): 0.004407[cm²/s]
Unsaturated Zone + Capillary Zone (D^T_{eff}): 0.001376[cm²/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0002162
Ground Water Attenuation Factor (α_{GW}): 0.00006961
Target Concentrations are based on NON-CANCER risk.
Target Indoor Air Concentration: 7000[μ g/m³] or 1613[ppbv]

¹Less Protective Target Concentrations

Soil Gas: Saturation[μ g/m³] or Saturation[ppbv]; Ground Water: Solubility[μ g/L]

²Best Estimate Target Concentrations

Soil Gas: Saturation[μ g/m³] or Saturation[ppbv]; Ground Water: Solubility[μ g/L]

²More Protective Target Concentrations

Soil Gas: 1.004e7[μ g/m³] or 2.314e6[ppbv]; Ground Water: Solubility[μ g/L]

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for soil-gas to indoor-air pathway. Diffusion through soil is the overall rate-limiting process for groundwater to indoor-air pathway.

¹"Less Protective" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

²"More Protective" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.

TARGET MEDIA CONCENTRATION RESULTS



Screening-Level Johnson and Ettinger Model

Site Name: Former Duluth Drycleaner Site
Report Date: Thu Jun 17 12:39:55 EDT 2010
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm
Depth to contamination from bottom of foundation: 40ft +/- 10ft
Average ground water temperature: 17C

CHEMICAL PROPERTIES

Chemical of Concern: p-Xylene CAS Number: 106423
Molecular Weight: 106.17[g/mole] Henrys Constant: 0.1999705[unitless]
Diffusivity in Air: 7.690e-2[cm²/sec] Diffusivity in Water: 8.440e-6[cm²/sec]
Unit Risk Factor: 0[(μ g/m³)⁻¹] Reference Concentration: 7[mg/m³]

SOIL PROPERTIES

Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES

Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr⁻¹]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m²]
Subsurface Foundation Area: 106[m²] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS

Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]
Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS

Effective Diffusion Coefficients:

Unsaturated Zone(D_{eff}): 0.004841[cm²/s]
Unsaturated Zone + Capillary Zone (D^T_{eff}): 0.001505[cm²/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0002365
Ground Water Attenuation Factor (α_{GW}): 0.00007605
Target Concentrations are based on NON-CANCER risk.
Target Indoor Air Concentration: 7000[μ g/m³] or 1613[ppbv]

¹Less Protective Target Concentrations

Soil Gas: Saturation[μ g/m³] or Saturation[ppbv]; Ground Water: Solubility[μ g/L]

²Best Estimate Target Concentrations

Soil Gas: 2.960e7[μ g/m³] or 6.822e6[ppbv]; Ground Water: Solubility[μ g/L]

²More Protective Target Concentrations

Soil Gas: 9.270e6[μ g/m³] or 2.136e6[ppbv]; Ground Water: Solubility[μ g/L]

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for soil-gas to indoor-air pathway. Diffusion through soil is the overall rate-limiting process for groundwater to indoor-air pathway.

¹"Less Protective" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

²"More Protective" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.

TARGET MEDIA CONCENTRATION RESULTS



Screening-Level Johnson and Ettinger Model

Site Name: Former Duluth Drycleaner Site

Report Date: Thu Jun 17 12:42:15 EDT 2010

Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm

Depth to contamination from bottom of foundation: 40ft +/- 10ft

Average ground water temperature: 17C

CHEMICAL PROPERTIES

Chemical of Concern: Trichloroethylene CAS Number: 79016

Molecular Weight: 131.39[g/mole] Henrys Constant: 0.2909758[unitless]

Diffusivity in Air: 7.900e-2[cm²/sec] Diffusivity in Water: 9.100e-6[cm²/sec]

Unit Risk Factor: 0.00011[($\mu\text{g}/\text{m}^3$)⁻¹] Reference Concentration: 0.04[mg/m³]

SOIL PROPERTIES

Soil Type: Loam Total Porosity: 0.399

Unsaturated Zone Moisture Content:

low= 0.061 best estimate= 0.148 high= 0.24

Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]

Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES

Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr⁻¹]

Building Mixing Height: 2.44[m] Building Footprint Area: 100[m²]

Subsurface Foundation Area: 106[m²] Building Crack Ratio: 0.00038[unitless]

Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS

Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]

Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]

Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS

Effective Diffusion Coefficients:

Unsaturated Zone(D_{eff}): 0.004973[cm²/s]

Unsaturated Zone + Capillary Zone (D^T_{eff}): 0.001516[cm²/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0002426

Ground Water Attenuation Factor (α_{GW}): 0.00007656

Target Concentrations are based on CANCER risk.

Target Indoor Air Concentration: 0.02212[$\mu\text{g}/\text{m}^3$] or 0.004119[ppbv]

1 Less Protective Target Concentrations

Soil Gas: 499.4[$\mu\text{g}/\text{m}^3$] or 92.99[ppbv]; Ground Water: 2.363[$\mu\text{g}/\text{L}$]

Best Estimate Target Concentrations

Soil Gas: 91.19[$\mu\text{g}/\text{m}^3$] or 16.98[ppbv]; Ground Water: 0.9930[$\mu\text{g}/\text{L}$]

2 More Protective Target Concentrations

Soil Gas: 28.64[$\mu\text{g}/\text{m}^3$] or 5.332[ppbv]; Ground Water: 0.7838[$\mu\text{g}/\text{L}$]

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for soil-gas to indoor-air pathway. Diffusion through soil is the overall rate-limiting process for groundwater to indoor-air pathway.

¹"Less Protective" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

²"More Protective" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.



TARGET MEDIA CONCENTRATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: Former Duluth Drycleaner Site

Report Date: Thu Jun 17 12:43:06 EDT 2010

Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm

Depth to contamination from bottom of foundation: 40ft +/- 10ft

Average ground water temperature: 17C

CHEMICAL PROPERTIES

Chemical of Concern: Tetrachloroethylene CAS Number: 127184

Molecular Weight: 165.83[g/mole] Henrys Constant: 0.4958904[unitless]

Diffusivity in Air: 7.200e-2[cm²/sec] Diffusivity in Water: 8.200e-6[cm²/sec]

Unit Risk Factor: 0.000003[(μ g/m³)⁻¹] Reference Concentration: 0[mg/m³]

SOIL PROPERTIES

Soil Type: Loam Total Porosity: 0.399

Unsaturated Zone Moisture Content:

low= 0.061 best estimate= 0.148 high= 0.24

Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]

Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES

Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr⁻¹]

Building Mixing Height: 2.44[m] Building Footprint Area: 100[m²]

Subsurface Foundation Area: 106[m²] Building Crack Ratio: 0.00038[unitless]

Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS

Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]

Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]

Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]

Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS

Effective Diffusion Coefficients:

Unsaturated Zone(D_{eff}): 0.004532[cm²/s]

Unsaturated Zone + Capillary Zone (D^T_{eff}): 0.00135[cm²/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0002221

Ground Water Attenuation Factor (α_{GW}): 0.00006832

Target Concentrations are based on CANCER risk.

Target Indoor Air Concentration: 0.8111[μ g/m³] or 0.1197[ppbv]

¹Less Protective Target Concentrations

Soil Gas: 2.009e4[μ g/m³] or 2964.[ppbv]; Ground Water: 56.31[μ g/L]

²Best Estimate Target Concentrations

Soil Gas: 3653.[μ g/m³] or 538.9[ppbv]; Ground Water: 23.94[μ g/L]

²More Protective Target Concentrations

Soil Gas: 1136.[μ g/m³] or 167.6[ppbv]; Ground Water: 19.00[μ g/L]

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for soil-gas to indoor-air pathway. Diffusion through soil is the overall rate-limiting process for groundwater to indoor-air pathway.

¹"Less Protective" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

²"More Protective" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.



TARGET MEDIA CONCENTRATION RESULTS

Screening-Level Johnson and Ettinger Model

Site Name: Former Duluth Drycleaner Site
Report Date: Thu Jun 17 12:43:44 EDT 2010
Report Generated From: http://www.epa.gov/athens/learn2model/part-two/onsite/JnE_lite.htm
Depth to contamination from bottom of foundation: 40ft +/- 10ft
Average ground water temperature: 17C

CHEMICAL PROPERTIES

Chemical of Concern: Toluene CAS Number: 108883
Molecular Weight: 92.14[g/mole] Henrys Constant: 0.1823458[unitless]
Diffusivity in Air: 8.700e-2[cm²/sec] Diffusivity in Water: 8.600e-6[cm²/sec]
Unit Risk Factor: 0[(μ g/m³)⁻¹] Reference Concentration: 0.4[mg/m³]

SOIL PROPERTIES

Soil Type: Loam Total Porosity: 0.399
Unsaturated Zone Moisture Content:
low= 0.061 best estimate= 0.148 high= 0.24
Capillary Zone Moisture Content: 0.332 Height of Capillary Rise: 0.375[m]
Soil-Gas Flow Rate into Building: 5 [L/min]

BUILDING PROPERTIES

Building Type: Slab-on-Grade Air Exchange Rate: 0.25[hr⁻¹]
Building Mixing Height: 2.44[m] Building Footprint Area: 100[m²]
Subsurface Foundation Area: 106[m²] Building Crack Ratio: 0.00038[unitless]
Foundation Slab Thickness: 0.1[m]

EXPOSURE PARAMETERS

Exposure Duration: carcinogens 30 [years] non-carcinogens: 30 [years]
Exposure Frequency: carcinogens 350 [days/year] non-carcinogens: 365 [days/year]
Averaging Time: carcinogens 70 [years] non-carcinogens: 30 [years]
Risk Factor for carcinogens: 1E-6 Target Hazard Quotient for non-carcinogens: 1

JOHNSON & ETTINGER SIMULATION RESULTS

Effective Diffusion Coefficients:

Unsaturated Zone(D_{eff}): 0.005477[cm²/s]
Unsaturated Zone + Capillary Zone (D^T_{eff}): 0.001702[cm²/s]

Soil Gas Attenuation Factor (α_{SG}): 0.0002658
Ground Water Attenuation Factor (α_{GW}): 0.00008579
Target Concentrations are based on NON-CANCER risk.
Target Indoor Air Concentration: 400[μ g/m³] or 106.2[ppbv]

Less Protective Target Concentrations

Soil Gas: 8.202e6[μ g/m³] or 2.178e6[ppbv]; Ground Water: 6.144e4[μ g/L]

Best Estimate Target Concentrations

Soil Gas: 1.505e6[μ g/m³] or 3.996e5[ppbv]; Ground Water: 2.557e4[μ g/L]

More Protective Target Concentrations

Soil Gas: 4.777e5[μ g/m³] or 1.268e5[ppbv]; Ground Water: 2.009e4[μ g/L]

Based on parameter analysis: Advection is the dominant mechanism across foundation. Diffusion through soil is the overall rate-limiting process for soil-gas to indoor-air pathway. Diffusion through soil is the overall rate-limiting process for groundwater to indoor-air pathway.

¹"Less Protective" concentrations produced with HIGHEST moisture content and DEEPEST depth to contamination.

²"More Protective" concentrations produced with LOWEST moisture content and SHALLOWEST depth to contamination.

DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

Reset to
Defaults

YES X

OR
CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES

MORE

ENTER

Chemical CAS No. (numbers only, no dashes)	Initial soil conc., C_R ($\mu\text{g}/\text{kg}$)	Chemical 67641 <input type="checkbox"/> Acetone <input type="checkbox"/>
---	---	---

ENTER

1 of 1

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	Depth below grade to top of contamination, L_t (cm)	Average soil temperature, T_s (°C)	Vadose zone SCS Soil type (used to estimate soil vapor permeability)	Vadose zone User-defined vadose zone soil vapor permeability, k_v (cm^2)	Vadose zone soil organic carbon fraction, f_{oc}	Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (l/m)
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ENTER Vadose zone SCS soil type Lookup Soil Parameters	Vadose zone soil dry bulk density, ρ_b^A (q/cm^3)	Vadose zone soil total porosity, n_v (unitless)	Vadose zone soil water-filled porosity, ρ_w (cm^3/cm^3)	Vadose zone soil organic carbon fraction, f_{oc} (unitless)	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ENTER Averaging time for carcinogens, AT_C (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ENTER Averaging time for carcinogens, AT_C (yrs)	30 30 30 350	30 30 30 350	1.0E-06 1.0E-06 1.0E-06 1	Used to calculate risk-based soil concentration.	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen ($\mu\text{g}/\text{kg}$)	Indoor exposure soil conc., noncarcinogen ($\mu\text{g}/\text{kg}$)	Risk-based indoor exposure soil conc., ($\mu\text{g}/\text{kg}$)	Soil saturation conc., C_{sat} ($\mu\text{g}/\text{kg}$)	Final indoor exposure soil conc., ($\mu\text{g}/\text{kg}$)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.34E+04	3.34E+04	3.34E+04	9.44E+07	3.34E+04	NA

MESSAGE SUMMARY BELOW:

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

Reset to
DefaultsYES X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES **ENTER**Initial
soil
conc.,
 C_R
($\mu\text{g}/\text{kg}$)Chemical
CAS No.
(numbers only,
no dashes)

Chlorine

67641 Acetone **ENTER**Depth below
grade to top
of contaminated
space floor,
 L_f
(15 or 200 cm)

Acetone

MORE
ENTERDepth below
grade to top
of contaminated
space floor,
 L_i
(cm)

Vadose zone SCS Soil type	Average soil temperature, T_s (°C)	Depth below grade to top of contaminated space floor, L_i (cm)	Depth below grade to top of contaminated space floor, L_f (15 or 200 cm)
------------------------------	---	---	---

ENTERVadose zone
soil dry
bulk density,
 ρ_b^A
(g/cm^3)

Acetone

ENTERVadose zone
soil total
porosity,
 n_v
(unitless)

Acetone

ENTERVadose zone
soil water-filled
porosity,
 ρ_w
(cm^3/cm^3)

Acetone

ENTERVadose zone
soil organic
carbon fraction,
 f_{oc}
(unitless)

Acetone

ENTERUser-defined
vadose zone
soil vapor
permeability,
 k_v
(cm^2)

Acetone

ENTERTarget hazard
quotient for
noncarcinogens,
THQ

Acetone

ENTERUsed to calculate risk-based
soil concentration.**END**

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen ($\mu\text{g}/\text{kg}$)	Indoor exposure soil conc., noncarcinogen ($\mu\text{g}/\text{kg}$)	Risk-based indoor exposure soil conc., ($\mu\text{g}/\text{kg}$)	Soil saturation conc., C_{sat} ($\mu\text{g}/\text{kg}$)	Final indoor exposure soil conc., ($\mu\text{g}/\text{kg}$)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.12E+04	8.12E+04	9.44E+07	8.12E+04	NA	NA

MESSAGE SUMMARY BELOW:

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

Reset to
Defaults YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box)

 YES**ENTER**

Chemical
CAS No.
(numbers only,
no dashes)

 156592

Chemical

ENTER

Initial
soil
conc.,
 C_R
($\mu\text{g}/\text{kg}$)

ENTER

Depth below
grade to top
of contamination,
 L_i
(15 or 200 cm)

 15

ENTER

Average
soil
temperature,
 T_s
($^{\circ}\text{C}$)

 305

ENTER

10

ENTER

Vadose zone
SCS
soil type
**Lookup Soil
Parameters**

 L

Vadose zone
soil total
porosity,
 n_v
(unitless)

 1.59

ENTER

10

ENTER**ENTER**

Vadose zone
soil water-filled
porosity,
 n_w
(cm^3/cm^3)

 0.399

ENTER**ENTER****ENTER****ENTER****ENTER**

Depth
below grade
to bottom
of enclosed
space floor,
 L_f
(15 or 200 cm)

 15

ENTER

Average
soil
temperature,
 T_s
($^{\circ}\text{C}$)

 305

ENTER

Vadose zone
SCS
soil type
**Lookup Soil
Parameters**

 L

ENTER

Vadose zone
soil total
porosity,
 n_v
(unitless)

 10

ENTER

Vadose zone
soil water-filled
porosity,
 n_w
(cm^3/cm^3)

 0.148

ENTER**ENTER****ENTER****ENTER****ENTER****ENTER****ENTER****ENTER****ENTER**

Chemical
CAS No.
(numbers only,
no dashes)

 cis-1,2-Dichloroethylene

ENTER

Initial
soil
conc.,
 C_R
($\mu\text{g}/\text{kg}$)

ENTER

Depth below
grade to top
of contamination,
 L_i
(15 or 200 cm)

 15

ENTER

Average
soil
temperature,
 T_s
($^{\circ}\text{C}$)

 305

ENTER

Vadose zone
SCS
soil type
**Lookup Soil
Parameters**

 L

ENTER

Vadose zone
soil total
porosity,
 n_v
(unitless)

 10

ENTER

Vadose zone
soil water-filled
porosity,
 n_w
(cm^3/cm^3)

 0.002

ENTER**ENTER****ENTER****ENTER****ENTER****ENTER**

Depth
below grade
to bottom
of enclosed
space floor,
 L_f
(15 or 200 cm)

 15

ENTER

Average
soil
temperature,
 T_s
($^{\circ}\text{C}$)

 305

ENTER

Vadose zone
SCS
soil type
**Lookup Soil
Parameters**

 L

ENTER

Vadose zone
soil total
porosity,
 n_v
(unitless)

 10

ENTER

Vadose zone
soil water-filled
porosity,
 n_w
(cm^3/cm^3)

 0.002

ENTER**ENTER****ENTER****ENTER****ENTER****ENTER**

Depth
below grade
to bottom
of enclosed
space floor,
 L_f
(15 or 200 cm)

 15

ENTER

Average
soil
temperature,
 T_s
($^{\circ}\text{C}$)

 305

ENTER

Vadose zone
SCS
soil type
**Lookup Soil
Parameters**

 L

ENTER

Vadose zone
soil total
porosity,
 n_v
(unitless)

 10

ENTER

Vadose zone
soil water-filled
porosity,
 n_w
(cm^3/cm^3)

 0.002

ENTER**ENTER****ENTER****ENTER****ENTER**

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen ($\mu\text{g}/\text{kg}$)	Indoor exposure soil conc., noncarcinogen ($\mu\text{g}/\text{kg}$)	Risk-based indoor exposure soil conc., noncarcinogen ($\mu\text{g}/\text{kg}$)	Soil saturation conc., C_{sat} ($\mu\text{g}/\text{kg}$)	Final indoor exposure soil conc., C_{sat} ($\mu\text{g}/\text{kg}$)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	9.36E+01	9.36E+01	9.36E+01	6.23E+05	9.36E+01	NA

MESSAGE SUMMARY BELOW:

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

SL-SCREEN
Version 3.1; 02/04

DATA ENTRY SHEET

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

Reset to
Defaults

YES X

OR
CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES

ENTER

Chemical
CAS No.
(numbers only,
no dashes)

Initial
soil
conc.,
 C_R
($\mu\text{g/kg}$)

Chemical

156592

cis-1,2-Dichloroethylene

MORE
↓

ENTER

Depth below
grade to top
of contaminated
space floor,
 L_i
(15 or 200 cm)

Average
soil
temperature,
 T_s
($^{\circ}\text{C}$)

Vadose zone
SCS
Soil type

User-defined
vadose zone
soil vapor
permeability,

k_v
(cm^2)

MORE
↓

ENTER

Vadose zone
soil dry
bulk density,
 ρ_b^A
(g/cm^3)

Vadose zone
soil total
porosity,
 n_v
(unitless)

Vadose zone
soil water-filled
porosity,
 ρ_w
(cm^3/cm^3)

Vadose zone
soil organic
carbon fraction,
 f_{oc}
(unitless)

Vadose zone
soil vapor
permeability

(unitless)

MORE
↓

ENTER

Averaging
time for
carcinogens,
 AT_c
(years)

Exposure
duration,
 ED
(years)

Exposure
frequency,
 EF
(days/yr)

Target
risk for
carcinogens,
 TR
(unitless)

Target hazard
quotient for
noncarcinogens,
 THQ
(unitless)

Used to calculate risk-based
soil concentration.

MORE
↓

ENTER

70

30

30

350

1.0E-06

1

END

ENTER
User-defined
vadose zone
soil vapor
permeability,
 k_v
(cm^2)

(Leave blank to calculate)

Q_{soil}
(l/m)

5

Used to calculate risk-based
soil concentration.

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen ($\mu\text{g}/\text{kg}$)	Indoor exposure soil conc., noncarcinogen ($\mu\text{g}/\text{kg}$)	Risk-based indoor exposure soil conc., ($\mu\text{g}/\text{kg}$)	Soil saturation conc., C_{sat} ($\mu\text{g}/\text{kg}$)	Final indoor exposure soil conc., ($\mu\text{g}/\text{kg}$)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.43E+02	2.43E+02	6.23E+05	2.43E+02	NA	NA

MESSAGE SUMMARY BELOW:

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

END

DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

 Reset to
Defaults

 YES X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

 YES
ENTER

Chemical CAS No. (numbers only, no dashes)	Initial soil conc., C_R ($\mu\text{g}/\text{kg}$)
---	---

Chemical

78933

Methyl/Ethyl/Ketone (2-butanone)**ENTER**

Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	Depth below grade to top of contamination, L_i (cm)	Average soil temperature, T_s (°C)	Vadose zone SCS Soil type (used to estimate soil vapor permeability)
---	---	--	---

ENTER

15	305	10	L
----	-----	----	---

ENTER

User-defined vadose zone soil vapor permeability, k_v (cm^2)	OR	Vadose zone soil organic carbon fraction, f_{oc}	ENTER
--	-----------	---	--------------

ENTER

Vadose zone SCS soil type Lookup Soil Parameters	Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	Vadose zone soil total porosity, n_v (unitless)	Vadose zone soil water-filled porosity, ρ_w (cm^3/cm^3)	Vadose zone soil organic carbon fraction, f_{oc} (unitless)
--	--	---	--	---

ENTER

L	1.59	0.399	0.148	0.002
---	------	-------	-------	-------

ENTER

Average vapor flow rate into bldg. (Leave blank to calculate)	ENTER	User-defined vadose zone soil vapor permeability, k_v (cm^2)	ENTER	Average vapor flow rate into bldg. (Leave blank to calculate)
---	--------------	--	--------------	---

ENTER

Averaging time for carcinogens, AT_C (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Target risk for carcinogens, TR (unitless)	Target hazard quotient for noncarcinogens, THQ (unitless)
--	--	---	--	---

ENTER

70	30	30	350	1.0E-06
----	----	----	-----	---------

ENTER

Used to calculate risk-based soil concentration.	5
---	---

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C _{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	5.20E+05	5.20E+05	2.18E+07	5.20E+05	NA	NA

MESSAGE SUMMARY BELOW:

MESSAGE: The values of C_{source} and C_{building} on the INTERCALCS worksheet are based on unity and do not represent actual values.

END

DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

Reset to
Defaults

YES X

OR
CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES

ENTER

Chemical
CAS No.
(numbers only,
no dashes)

Initial
soil
conc.,
 C_R
($\mu\text{g}/\text{kg}$)

78933

Chemical

78933

Methyl/Ethyl/Ketone (2-butanone)

ENTER

Depth below
grade to top
of enclosed
space floor,
 L_f
(15 or 200 cm)

ENTER

Depth below
grade to top
of contamination,
 L_i
(cm)

MORE
↓

ENTER

Average
soil
temperature,
 T_s
(°C)

ENTER

Vadose zone
SCS
soil type

Lookup Soil
Parameters

ENTER

Vadose zone
soil dry
bulk density,
 ρ_b^A
(g/cm^3)

ENTER

Vadose zone
soil total
porosity,
 n_v
(unitless)

ENTER

Vadose zone
soil water-filled
porosity,
 ρ_w
(cm^3/cm^3)

ENTER

Vadose zone
soil organic
carbon fraction,
 f_{oc}
(unitless)

ENTER

Vadose zone
soil vapor
permeability
(cm^2)

ENTER

User-defined
vadose zone
soil vapor
permeability,
 k_v
(cm^2)

ENTER

Average vapor
flow rate into bldg.
(Leave blank to calculate)
 Q_{soil}
(l/m)

ENTER

5

ENTER

1

ENTER

Used to calculate risk-based
soil concentration.

ENTER

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen ($\mu\text{g}/\text{kg}$)	Indoor exposure soil conc., noncarcinogen ($\mu\text{g}/\text{kg}$)	Risk-based indoor exposure soil conc., ($\mu\text{g}/\text{kg}$)	Soil saturation conc., C_{sat} ($\mu\text{g}/\text{kg}$)	Final indoor exposure soil conc., ($\mu\text{g}/\text{kg}$)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.34E+06	1.34E+06	1.34E+06	2.18E+07	1.34E+06	NA

MESSAGE SUMMARY BELOW:

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

END

DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

Reset to
DefaultsYES X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES **ENTER**

Chemical CAS No. (numbers only, no dashes)	Initial soil conc., C_R ($\mu\text{g}/\text{kg}$)
---	---

Chloroethylene

MORE**↓**

Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	Depth below grade to top of contamination, L_i (cm)	Average soil temperature, T_s ($^{\circ}\text{C}$)
---	---	--

ENTER

Vadose zone SCS soil type	Depth below grade to top of contamination, L_i (cm)	Average soil temperature, T_s ($^{\circ}\text{C}$)
---------------------------------	---	--

ENTER

Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	Vadose zone soil total porosity, n_v (unitless)	Vadose zone soil water-filled porosity, n_w (cm^3/cm^3)
--	---	---

ENTER

Vadose zone soil organic carbon fraction, f_{oc}	Vadose zone soil organic carbon fraction, f_{oc} (unitless)
---	---

ENTER

User-defined vadose zone soil vapor permeability, k_v (cm^2)	User-defined vadose zone soil vapor permeability, k_v (cm^2)
--	--

ENTER

Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (l/m)	Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (l/m)
--	--

ENTER

Target hazard quotient for noncarcinogens, THQ	Target hazard quotient for noncarcinogens, THQ
---	---

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen ($\mu\text{g}/\text{kg}$)	Indoor exposure soil conc., noncarcinogen ($\mu\text{g}/\text{kg}$)	Risk-based indoor exposure soil conc., noncarcinogen ($\mu\text{g}/\text{kg}$)	Soil saturation conc., C_{sat} ($\mu\text{g}/\text{kg}$)	Final indoor exposure soil conc., C_{sat} ($\mu\text{g}/\text{kg}$)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
7.20E-01	1.09E+03	7.20E-01	9.12E+04	7.20E-01	NA	NA

MESSAGE SUMMARY BELOW:

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

END

DATA ENTRY SHEET

SL-SCREEN
Version 3.1; 02/04

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

Reset to
Defaults

YES X

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES

ENTER

Chemical CAS No. (numbers only, no dashes)	Initial soil conc., C_R ($\mu\text{g/kg}$)	Chemical 127184	Tetrachloroethylene
---	--	--------------------	---------------------

MORE ↓

ENTER

Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	Depth below grade to top of contamination, L_I (cm)	Average soil temperature, T_S (°C)	Vadose zone SCS Soil type (used to estimate soil vapor permeability)
15	857	10	L

ENTER

ENTER

Vadose zone SCS soil type Lookup Soil Parameters	Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	Vadose zone soil total porosity, n_v (unitless)	Vadose zone soil water-filled porosity, ρ_w (cm^3/cm^3)
L	1.59	0.399	0.148

ENTER

ENTER

Vadose zone SCS soil type Lookup Soil Parameters	Averaging time for noncarcinogens, AT_{NC} (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Vadose zone soil organic carbon fraction, f_{OC} (unitless)
L	70	30	30	0.002

ENTER

ENTER

Vadose zone SCS soil type Lookup Soil Parameters	Averaging time for carcinogens, AT_C (yrs)	Exposure duration, ED (yrs)	Exposure frequency, EF (days/yr)	Vadose zone soil organic carbon fraction, f_{OC} (unitless)
L	70	30	30	0.002

ENTER

User-defined
vadose zone
soil vapor
permeability,
 k_v
(cm^2)

ENTER

Average vapor
flow rate into bldg.
(Leave blank to calculate)
 Q_{soil}
(l/m)

ENTER

OR

Vadose zone
Soil type
(used to estimate
soil vapor
permeability)

ENTER

Target
risk for
carcinogens,
TR
(unitless)

ENTER

Target hazard
quotient for
noncarcinogens,
THQ
(unitless)

ENTER

ENTER

Used to calculate risk-based
soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen ($\mu\text{g}/\text{kg}$)	Indoor exposure soil conc., noncarcinogen ($\mu\text{g}/\text{kg}$)	Risk-based indoor exposure soil conc., C _{sat} ($\mu\text{g}/\text{kg}$)	Soil saturation conc., C _{sat} ($\mu\text{g}/\text{kg}$)	Final indoor exposure soil conc., ($\mu\text{g}/\text{kg}$)
1.88E+00	2.84E+03	1.88E+00	9.12E+04	1.88E+00

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA

MESSAGE SUMMARY BELOW:

MESSAGE: The values of Csource and Cbuilding on the INTERCALCS worksheet are based on unity and do not represent actual values.

END